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EDITED BY

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EDITORIAL.

The key-note of this issue of the PEDAGOGICAL SEMINARY is *health*.

Nature inclines the normal child to free and almost incessant activity; the modern school requires him to sit still. No less than a sprouting plant his instinct seeks and needs sunlight; but the schoolroom is very often too dark, while the first steps in reading and writing require for the child nearly as abundant light as does microscopy for adults. (Read PED. SEM., II, 33 et seq.) The eye needs great freedom of movement from left to right, and of accommodation for different distances, but school confines it to the zig-zag of the printed line and page, straining at best, but with added difficulties which could be easily removed, II, 49. The hand is a wonderful organ, and its brain-centers complex and extended; but instead of training all its mechanical powers its energies are focused on the wagging the pen which is too small, too light, and too exact and monotonous in its movements for the stage of development of these centers. His lungs for health and for growth, his blood for all its nutritive functions to the brain and other organs need an incessant supply of the freshest, purest air, but the schoolhouse limits the air space to a few cubic feet per child, economizes, if nowhere else, in either its ventilating system or its working, or both, and rarely exterminates the peculiar "school smell." Room-temperature has a great effect upon the energy and sustained effort of the brain; but

systems are imperfect for both equalizing it throughout the room, and for keeping it constant, while in the country it is apt to be too high, II, 22. The seat in which so much time is spent does much to determine the attitude during the most critical years of growth. It should be fitted to each child like a suit of clothes and at least semi-annually; the school assigns seats more often by rank or age than size, prefers ease in getting in and out to physiological fit, while the form of seat often favors a "collapse attitude" by which chest and stomach are compressed rather than expanded, instead of developing a healthy attitude of sitting. Pen and and pencil work, greatly on the increase now, are commonly so taught as to favor wry growth of the spine, II, 39. Not only to a large degree of freedom but to happiness childhood has a sacred right. School should not foster a diathesis of worry or anxiety, or of spirty cram for examinations. The native interests and fresh, eager curiosities of children are the sacred buds of mental growth and should not be blighted by the dismal, dry method work, which gives form where substance is asked for, and slowly but surely breeds apathy, indifference and distaste for the exquisite pleasures of intellectual activity. Just as it is wrenching, in the phrase of an American humorist, to kick at nothing, so an impoverished curriculum sterilizes the mind. All the best education is individual, but in school the free growth of the forest gives way to the monotonous rows of the nursery, Vol. I, p. 121. Instead of working for the best children in a class, as economy teaches, he should do, the American teacher feels it democratic to work for the average child. While the minute maceration of mental food favored by the idolatry of normal methods, sometimes so over refined that they would almost educate a bright dog or ape, often inclines teachers to seek a triumph, pedagogical in the sense that has brought disgrace

upon that noble word, by focusing their efforts upon the slower members of the class, who should be in a dullard school. Women are the natural trainers of young children, and have certain advantages in their vocation which men can never equal, but lack the body of voice and the muscle of men. The very presence of the latter, even if never exerted, has a wholesome influence upon boys. Few women take up teaching as a life work, and on an average they teach less than three years in this country. This makes their work too often amateurish, inexperienced and unprofessional, while the number of female teachers, already 90 per cent. in some places, is steadily increasing among us. Both the tax-payers and the teachers are suspicious of the doctor in schools, and rarely favor medical inspection, I, 299, II, p. 170, while doctrinaires are permitted to abolish the recess in many entire cities, to prescribe positively deforming attitudes in writing, and to enforce systems of gymnastics that are unnatural and do more harm than good. Very much sedantry brain and eye work is trying under the best hygenic conditions and even for adults. The school focuses an enormous strain also upon the few tiny tongue- and pen-wagging muscles hardly one-hundredth by weight of all the muscles of the body. Most of the muscular system, which is the organ of the will, and has done all man's work in the world, II, 72, is allowed to grow flabby and thus the chasm between knowing and doing is widened, the will is weakened, and it is forgotten how akin weakness is to wickedness, II, 75.

The result of all these dangers in seen in the loss of weight on entering school, and the growth of diseases of eye, spine, stomach, throat, headaches and the far more subtle nervous disorders which increase with advancing school years, I, 117, 245, 297, 299; II, 65. Happily, with these evils, is now growing up in the best minds a new and deep interest in school

hygiene, school gardens II, 180; school excursions, I, 467, II, 181; school baths, I, 425, II, 36; school lunches, manual training, more interesting and meaty subject matter of study, etc. These gain importance and promise amelioration. In the science that deals with the wide field of diseases and decay of the nervous system, *fatigue* has lately come to occupy perhaps the most prominent place. Many forms of disease, formerly thought to have other origin, are now known to be caused by fatigue, II, 107, 177. In its early stages it seems to bring not only habits of haste and inaccuracy, II, 60-5, but inertness and moral vulnerability. The relations between growth and amount and kind of work, how to combine labor and rest in a way to give the most development and economy of force, on which rest the problem of the length and divisions of the school lesson, day and year, are now being scientifically explored with promise.

The clear eye, soft and glossy hair, the fresh cheek, the supurb flesh, the hungry, tireless curiosity which bolts and digests facts like an ostrich, but languishes and dies if fed with methods, manner and slow approaches, the spontaneities and insight, often startling, (which if faithfully recorded of even an average child, would show that children are naturally geniuses, and would make a volume of greater value than all we now have in print) the occasional miracle of nascent talent and superior powers, the helplessness, naiveity and in all the boundless and prolonged placticity to everything in its environment, unconscious as well as conscious, and its vast freight of heredity, good and ill, from both the near and a boundless past;—all these are born of perfect health. It is these that deserve and command the most supreme love and devotion of all the objects in the world, and it is love of these that has inspired the great reformers of education. Everything about the school building should be plastic to the needs

of the growth of childhood. Methods should be based upon the all-sided study of its nature. Subject matter whether of literature, science or religion should be loved and used only as means to the development of childhood and never by the teachers of children as ends in themselves. Women's love perhaps can do this by instinct, but men must study it.

The school is now the most nearly universal of all culture institutions. It is the most uniform in all lands. It controls the body and mind of plastic childhood more hours per day and more days per year than it was ever controlled by any institution in history. There is a consensus of belief in school education never attained on any subject in the world before (I, pp. 120-1, 245; I, No. 2 passim). Instead of tending toward racial degeneration and breeding school diseases, education ought to increase enjoyment, promote nutrition, strength, longevity, robustness and tend not only to the perpetuation but the improvement and enlargement of family stocks. It should increase virtue, and solidity of character. Moral and hygienic habituation should be established before and as a basis of instruction and of belief, II, 72-89. It should deepen and nurture old interests, and give poise, repose and reserve, along with eager curiosity. Body and mind should be brought to the fullest and most complete maturity of which they are capable. This summarizes the duty of both parents and the state to the child.

A ton of knowledge bought at the cost of an ounce of health, which is the most ancient and precious form of wealth and worth, costs more than its value. Better Tolstoi's kind of liberty, I, 113, or the old knightly contempt of pen and book work as the knack of craven, thin-blooded clerks, better idyllic ignorance of even the invention of Cadmus if the worst that the modern school now causes must be taken in order to get the best it has to give. Sooner or later every-

thing pertaining to education, from the site of the buildings to the contents of every text book, and the methods of each branch of study must be scrutinized with all the care and detail at the command of scientific pedagogy and judged from the standpoint of health. What shall a child give in exchange for his health, or what shall it profit a child if he gain the whole world of knowledge and lose his own health?

OUTLINES OF SCHOOL HYGIENE.

By Wm. H. Burnham.

I.—Introduction.

School Hygiene in a broad sense has to do with the conditions that favor the normal functioning of the nervous mechanism. Starting on the basis of physiological psychology, it assumes that every psychic process has its correlative in a physiological process; or, as Mercier(1)* expresses it, "a state of mind never occurs as an isolated fact. When an alteration occurs in consciousness, something else always takes place at the same time. This inevitable accompaniment of mental change is a change in the nervous system; and the change is, speaking broadly, a rearrangement of molecules in the gray matter of the superior regions of the nervous system." The philosophical question, in regard to the nature of the relation between the psychic and the physiological processes, is one with which we have nothing whatever to do†. This postulate of the correlation between physiological and psychic states is, however, fundamental; for it is this intimate relation between these two series of disparate phenomena which makes the study of the laws of nervous activity of prime importance in education.

It is necessary, then, to recount a few elementary principles of physiological psychology before considering the subject of school hygiene in the narrower sense.

The nervous mechanism is an apparatus for the storage and distribution of energy. Its capacity for storing energy is limited, and dependent, of course, upon the coöperating systems of the bodily organism. On occasion of appropriate stimuli, it distributes energy to all parts of the body. To quote Mercier(1—p. 46) again: "Not only in the gray matter do these

*The figures in parenthesis refer to similar figures in the bibliography. When the page is cited, this is given in the text with the figures just mentioned.

†Those interested in this matter may well begin their study by reading the chapter on Mind and Body in Höffding's Psychology, and by consulting the works of Mercier, Ladd, James, and Wundt.

currents of force circulate; they are carried by the nerves to the uttermost parts of the body. There is scarcely a recess or nook of the organism to which they do not penetrate. While by far the greatest quantity is draughted into the muscles, large supplies go to all the tissues, where their access regulates those molecular disintegrations, rearrangements and integrations that constitute nutrition and waste, secretion and excretion. The force thus expended is continually being renewed from the store that accumulates in the nerve-cells in the intervals of their activity. But however highly charged a nerve-cell may be, it never discharges spontaneously. However unstable its molecules, some force, even if infinitesimal, is needed to set the process going."

The next fundamental point to be considered is the unity of the physical mechanism which conditions psychic processes. Physiology looks upon the human body as a federated union of tissues. The several systems are differentiated in function; but they are so intimately related that what affects one affects all. Hence anything that affects the health of any part of the organism affects the nervous mechanism in greater or less degree; and thus the hygiene of the nervous system involves the hygiene of the whole body.

The unity of the nervous system is especially apparent, as is shown by many recent experiments. Every impression seems to be diffused throughout the nerve-centres. Notice the physiological concomitants of the simple psychic process, *sensation*. The circulation of the blood varies in a marked degree with changes in sensation, as shown by Mosso([2]) and others. Respiration is affected by sudden sensory stimuli. The glands respond; and the power of voluntary muscular contraction may be reinforced. Féré([3—II,p.379]) found that musical notes and colored lights increased the power of muscular contraction as measured by the dynamometer. Lombard([4]) and others have found that the knee-jerk is reinforced when other sensations occur simultaneously with the tap. And the iris has long served as an æsthesiometer. This diffusion of sensory stimuli is well illustrated by the effect of various sensations upon the sweat-glands. Tarchanoff([5]) applied electrodes to the skin in different parts of the body, and by means of a galvanometer was able to measure the effect of various sensory stimuli. Tickling caused a strong deflection of the needle. "Electricity, heat and cold, the prick of a needle, caused the same effect, but not to such an extent. So did stimulation of the special sense-organs, the sound of an electric bell, the smell of vinegar and ammonia, the taste of sugar, etc. After the eyes had been closed for some time, simply opening them was sufficient to produce a current. Different

effects were produced by different colors; the mere imagination of a sensation was sufficient to produce a change of from ten to fifteen divisions on the scale. . . . Any strong intellectual exertion produced a marked effect. Tarchanoff deems it proved that the course of nearly every kind of nervous activity,—from the simplest impressions and sensations to voluntary motions and the highest forms of mental exertion,—is accompanied by an increased activity in the glands of the skin. The plethysmographic investigations of Mosso, François-Frank, and others show that the blood-vessels of the extremities take part in all kinds of nervous activity. But they contract, and hence they are not the cause of the increased activity of the sweat-glands. That must be due to a special excitation of the nerve-centres which regulate them." More familiar and especially noteworthy illustration of the unity of the neural mechanism is afforded by the varied physiological concomitants of fear as shown by Mosso([2]). The muscles, the circulation, the action of the heart, lungs and viscera are all affected by sudden fright.

From such facts the law of the diffusion of stimuli is inferred. This has been formulated by Prof. James([3—II, p. 381.]) as follows: "A process set up anywhere in the centres reverberates everywhere, and in some way or other affects the organism throughout, making its activities either greater or less." The same writer likens the central nerve-mass to a good conductor charged with electricity. The tension cannot be changed in one place without altering it everywhere.

In our usual experience, besides this general diffusion of stimuli in the nervous system, special discharges occur along certain paths of least resistance that, so to speak, have been marked out by previous discharges. Hence, certain very definite reactions occur on occasion of given stimuli. The central process may be very complicated, a long train of thought, perhaps, being the psychic concomitant, but a movement is the final goal. Hence, our thoughts have been called half-way stations to action; or, as Bain puts it, "Thinking is restrained speaking or acting." The reflex arc is the type of all that is done by the nervous system. First, an incoming current along a sensory nerve; then, a central process more or less complicated; and, finally, a discharge along an efferent nerve, to some muscle or gland. In the phrase of Prof. James,([3]) the nervous system, physiologically considered, is "a machine for converting stimuli into reactions." The forming of habits of appropriate reaction to given stimuli is the work of education. And the plasticity of the nervous substance, which renders it capable of receiving impressions, and its power of retaining in growth its functional disposi-

tions, are what make the laws of neural activity of prime importance for education.

II.—Analogy between the Work of the Muscles and the Work of the Nerves.

When work is done by the human organism, both the muscles and the nerve-centers are involved, and it is impossible to determine accurately the share of each in what is accomplished; but not only are muscle and nerve thus intimately related, there is also a striking analogy in the conditions of their activity. "The conditions of work are the same," says Lagrange([6—p. 344]), "for the brain which thinks and for the muscle which contracts."

In the first place, when a muscle contracts there is an increased flow of blood to the part involved, and a general quickening of the circulation. In like manner, the nervous activity involved in mental effort is accompanied by an increase in cerebral blood-pressure. This was shown by Mosso([2]) in his experiments with the plethysmograph. During intellectual activity the blood-supply in the arms decreased, and there was an increase of blood-pressure in the brain. Again the subject lay upon a delicately constructed balance which remained horizontal when he was entirely in repose. Any sensation or emotion or intellectual activity caused the balance to tip toward the head, the subject, meanwhile, taking all precaution not to move or speak or do anything that would cause flow of blood to the head. Sometimes the subject took a nap on this scientific cradle, as Mosso calls it, and while he was asleep the noise of moving a chair, or the like, would be followed by an inclination of the balance toward the head. These results were corroborated by testing the intracranial blood pressure directly, in the case of several persons where the brain had been laid bare by lesion of the skull. On occasion of emotional excitement or other mental activity, the blood pressure rose.

Leumann([7]) studied the relation between thought and circulation in a different way. He tested the rapidity with which boys in a gymnasium scanned poetry, and also tested the rate of their pulse. The number of feet scanned in a minute seemed to be in direct ratio to the pulse frequency. In case of one person experimented upon from midday till evening, the dependence of normal reading of poetry on pulse frequency was shown. More rigidly scientific experiments upon animals make such results probable *à priori*.

In the second place, when a muscle contracts a greater amount of heat is liberated. The same is true of brain-work.

Dr. J. S. Lombard([8]) made a very large number of observations upon the temperature of the head during intellectual activity, using delicate thermometers. Any difficult or interesting activity, especially anything that aroused emotion, caused a rise in temperature. Schiff([9]) experimented on dogs and chickens by plunging a thermo-electric needle into their brains and then testing them with various stimuli. Sensations of touch, sight, smell and hearing were followed by indications of changes in the cerebral temperature in varying degrees. A sharp whistle, or the odor of meat, for example, was at once followed by a deflection of the galvanometer. Tanzi,([10]) and others, have made similar experiments; and, although the results of different investigators do not entirely agree, the general law seems altogether probable that activity of the nerve-centers, as well as muscular activity, is accompanied by an increase of temperature in the part involved.

Again, there are certain waste-products—products of dissimilation—which apparently result from nervous activity as well as from muscular work. It is not so easy to prove this in the case of the nerves as in that of the muscles; but many facts—such as the similarity of certain diseases resulting from mental and from muscular overwork, the excess of uric acid in the blood in both cases, and the turbidity of the urine found after excessive brain-work, as well as after excessive muscular work—point to the analogy. Mosso,([11]) in his experiments on muscular fatigue, was able to distinguish between the fatigue of the muscles and the fatigue of the nerve-centres; and his results corroborate this view that a poisonous substance is formed during nervous work. And the shrinking of the nerve-cells during work, shown by the investigations of Hodge([12]), add weight to the evidence.

III.—Fatigue.

The nervous system, as has been said, is a mechanism for the storage and distribution of energy. But its power of storing energy is limited. Hence, at any moment, only a limited amount of energy is available. If more goes to one form of activity, less can be expended in another. In epilepsy, for example, when muscular contraction is at a maximum, consciousness is at a minimum; and when consciousness seems to be at a maximum, as in certain states of ecstasy, motor activity is at a minimum. Moreover, when any one phase of consciousness predominates, the other forms of consciousness are likely to be weakened. For example, during intense emotion, intellectual activity is at a minimum; and during intense intellectual activity, extreme emotion is impossible. It is evident that the one essential thing in economic mental ac-

tivity is the maintenance of the proper balance between the storage and the expenditure of energy. How may it be known when this balance is disturbed, when the expenditure *exceeds* the income? To a normal person, the sensation of fatigue is the sign. In the case of muscular work, the warning is so strong that there is little danger of over-exertion. In case of nervous work, the warning is not as easily recognized.

Although the nerve-fibers seem capable of functioning for an indefinite period, as shown by Bowditch([13]) and others, and the effect of work upon them is not yet apparent, the nerve cells undergo remarkable changes during continued activity. After electrical stimulation of ganglion cells in frogs and cats, Dr. Hodge([12]) found a remarkable shrinking of the nerve-cells, particularly of the nuclei. But the cell recovers after a sufficient period of rest. After rather severe work for five hours, the *nucleus* has shrunk to about half its normal size. By complete rest for six hours, the cell recovers about half what it has lost; but, at least, twenty-four hours of rest are necessary for complete recovery([14]). The same conditions of fatigue can be reached in less time by increasing the stimulus. In further experiments, of which the results will soon be published, Dr. Hodge extended his observations to other animals; and studied the effects of ordinary diurnal fatigue, as shown in the brain, as well as in the cord and spinal ganglia. A remarkable difference was found between the condition of the cells in the morning and at night. For example, in the brain-cells of honey-bees taken at night, the nuclei had shrunken about a third. Of course, we cannot apply just the same figures to the cells of the human brain; but we must suppose that something similar occurs during nervous activity. Mental work exhausts the nerve-cells, and they recover slowly.

Still further light is thrown upon the subject of nervous fatigue by the results of experiments upon muscular fatigue. The studies of Mosso([11]), Maggiora([15]), and Lombard([16]) have shown that muscular fatigue is largely central. Voluntary innervation is a stronger stimulus than electrical stimulation, but when voluntary contraction is impossible the muscles are still capable of raising the weight if stimulated directly by electricity or indirectly by stimulation of the motor nerves. In one of Mosso's experiments, the muscle was kept constantly at work; first it was worked to fatigue by voluntary stimulation, then made to contract by electrical stimulation, then innervated again by the will. Here the nerve-centres rested while electrical stimulation was employed, as shown by the great increase in the amount of contraction when voluntary innervation succeeded the electrical stimulation. Hence the experimenters were able, to some extent, to

study the central fatigue and the muscular fatigue separately. Waller([17]) has done the same and, like, Lombard, maintains that fatigue from voluntary stimulation of a muscle is in major part central.

It is very difficult to get good tests of the functional activity of the central nervous system. But when we consider the analogous conditions of muscular and nervous work, and the fact that the experiments just mentioned had to do largely with central fatigue, it is more than a mere conjecture that the laws of nervous fatigue are in great part analogous to the laws of muscular fatigue, as formulated by Mosso([11]) and Maggiora([15]).

1. Maggiora([15]) found that, to do the maximum amount of work, intervals of rest must alternate with periods of work. Just as the muscle of the heart does its life-long work without fatigue, so with a suitable interval of rest, the muscles of the finger may contract for an indefinite length of time. Raising a weight of 6 kilogrammes, for example, with an interval of 10 seconds, no fatigue appeared. When a muscle was worked to fatigue, a rest of an hour and a half or of two hours was necessary to enable it completely to recover. And, as the weight was increased, the interval of rest must be increased still more; when the weight was doubled, it was not enough to double the interval of rest. Likewise, in nervous activity to do the maximum work, intervals of rest must alternate with periods of activity. And, as in the case of the muscle, the length of the interval of rest required depends upon the length of the preceding period of work and upon the intensity of the work.

2. Working a fatigued muscle injures it much more than much greater work under normal conditions. There is every reason to believe that the same is true of the nerve-centers; for not only have the fatigued nerve-cells undergone degeneration, but certain toxic products have probably been formed, as was said above. Every-day observation also makes this inference altogether probable.

3. Remarkable individual differences appear in the curve of muscular fatigue. Maggiora,([15—p. 207.]) for example, found that, while a rest of two hours was necessary in his own case to enable his muscles completely to recover from fatigue, only an hour and a half was necessary in the case of three soldiers with whom he experimented. After several months of exercise Dr. Lombard([16—p. 61.]) found himself able to work for 24 hours with intervals of rest of only 17 to 20 minutes. Such differences are he thinks due to the ratio in which central and peripheral fatigue are combined in the given case, recovery from the former being more rapid than from the latter.

Other differences appear. Mosso thinks each individual has his characteristic curve of muscular fatigue. There are evidently equally important individual differences in the laws of nervous fatigue, and especially in the power to recover from fatigue. No one can expend his nervous energy economically until he finds the periods of work and rest best adapted to his own individual organism.

Other analogies will occur to anyone who will read the suggestive articles by Mosso([11]), Maggiora([15]), and Lombard([16]). Inferences from subjective feeling corroborate what has been said so strongly, that the laws mentioned must seem almost commonplace. It would be unnecessary to dwell upon these laws were it not that these simple principles are strangely ignored in education. The old idea was that fatigue must be ignored. "Add tire to tire and at it again," was what the old farmers used to say to their boys. While adherence to such a precept may not have serious results in the case of muscular fatigue, since central fatigue protects from peripheral fatigue, it is a somewhat dangerous precept to follow in doing mental work.

What has thus far been said applies especially to what is sometimes called normal fatigue, the changes in the nerve-cells and the like being repaired by the daily rest and sleep. Besides this a condition of pathological fatigue may be distinguished, a condition where the storage of energy is at fault. Here the nutrition of the cells seems to be deficient, and they do not recover during an ordinary period of rest. "In the excess of nervous activity and of the metabolic processes," says Dr. Cowles([18 – p. 17]), "there appears to arise from the decomposition or 'combustion' of tissues, a condition of general inanition from inability of nerve-cells to take up the nutriment and oxygen presented to them in the circulation. Kowalewsky describes this as a demand for oxygen in the whole organism, or oxygen-hunger. This tends to increase, by deprivation, the partial and local inanition; and obviously the blood may be charged with an excess of the products of regressive metamorphosis, through inefficiency of the eliminative processes,—often because of weakened innervation. Then, he says, there is general auto-intoxication, which adds its influence to the limited and local neurasthenic condition that may have been previously established."

The danger, in case of pathological fatigue, is especially great, because there is apt to be anæsthesia of any feeling of fatigue. To quote again from Dr. Cowles([18—p. 72.]): "At all events," he says, "in such conditions as these and the equally common experience of the 'second-day tire,' there is that state of pathological fatigue which is marked by a nota-

ble absence of a due sense of tire. It is certainly obvious, as a physiological fact, and as a clinical observation, ... that the degree of bodily and mental fatigue is not measured by the feeling of it. It is one of the most familiar of all familiar facts that men and women are continually over-doing themselves without knowing it. When a condition of pathological fatigue is established, this anæsthesia of the sense of fatigue, in some degree, becomes a part of the general condition." Of course, the exaltation that often comes when working late at night illustrates this condition of anæsthesia.

Dr. Cowles finds this theory corroborated by the stages of recovery from neurasthenia. In the first stage of improvement the patient feels worse, because this anæsthesia to fatigue has disappeared.

IV.—Growth.

While there are striking individual differences in men's ability to do mental work, the main principles are the same. The question how much work an individual can do is merely a mathematical problem. What he accomplishes is in direct proportion to the ability of his nervous system to store energy and its economy in expending it. Just so much nervous energy is available. If more goes to one channel, less can go to another. Every unessential idea involves waste of energy. A man's efficiency depends upon his habits of mental thrift, no less upon the sensations which he ignores than upon those to which he attends, no less upon what he neglects than upon what he does. When, however, we consider especially the mental and correlative nervous activity of children, this relatively simple problem is complicated by another very important factor, namely, that of *growth*. Only a few points need here be mentioned. For a more extended treatment of the subject and for bibliographical references, the reader is referred to the article by Dr. Boas([19]) in the *Ped. Sem.*, Vol. I, pp. 225-228.

Growth varies at different periods of life. It is greatest during the earliest years of life and again at puberty. The periods of maximum growth are different in boys and in girls. And there are variations in growth due to differences in nationality, occupation of parents, and the like. There are also differences due apparently to climatic changes. The observations of Malling-Hansen indicate that children grow less in winter than in summer. Peckham also, found the same to be true of the children studied by him. Either the climatic difference, or else the long summer vacation, or both together are evidently the cause of this. "Key's([20]) law," based upon an investigation of the height, weight, and health of about

18,000 Swedish pupils, is that periods of maximum growth are periods of maximum power to resist disease. If this be true, the problem arises: Should school-work be relaxed during periods of rapid growth, as is generally supposed, or should work be diminished rather during the periods of less growth, which are also periods of greater liability to disease? Again all parts of the body do not develop at the same time. Each organ has its peculiar nascent period. Moreover, there is a close relation between the function of any organ and its development; and the highest degree of skill in the use of any organ can often be acquired only during the period of growth. The acquisition of a language, for example, is probably a case in point. If, during the period that the vocal organs and the corresponding nerve-centres in the brain are developing, attention is given to educating some other part which is not ready for training, two-fold loss is likely to be the result, waste of energy or injury in case of the latter, loss of opportunity in case of the former. These facts are mentioned to show how complicated is the problem of determining the hygienic conditions for education of the growing child and the need of farther anthropological investigations.

V.—Entering School.

Although, to borrow Mosso's(2) simile, the human body is like a vast laboratory where one reads "no admittance" on every door and at every corner, and comparatively little is known of the neural processes, nevertheless, many facts of prime importance have been ascertained; and, though we know little, it is important to heed what is known. Recalling the elementary principles that have just been outlined, that the nervous system of the growing child is an apparatus for converting stimuli into reactions, that this involves the storage and distribution of energy, that the nervous mechanism is marvelously delicate and sensitive, responding to every stimulus from its environment; moreover, that the nerve-centres are plastic, retaining in growth the traces of their functional activity, and that education is the training of the organism to make appropriate responses on occasion of given stimuli, beginning, of course, long before school life and even before birth, note what happens at that great epoch in life when a child enters school. There is a great change in environment. The freedom of the home and of the street must be given up for the restraint of the school-room. Customary stimuli are replaced by new ones. Customary reactions must be inhibited and new forms of response acquired. In general, an attempt is made to develop the power of inhibition and of

voluntary attention. In short, a systematic attempt is made to regulate both stimuli and reactions, in order to produce good habits.

Just as there are great differences in the contents of children's minds on entering school, so there are great individual differences in their habits of attending to sensori-stimuli and in their habits of response. Hence not only the contents of a child's mind, but also his powers of observation and motor ability should be tested on the threshold of school-life; and the individual differences should be remembered in determining all such matters as the kind of work required, length of periods of study and recreation, length of the school-day, kind of exercise, and the like.

In what has already been said special attention has been given to the nervous system, since its proper functioning is the necessary condition for study. But it must be constantly remembered that, since the body is a federated union of tissues, what affects one part affects all, and hence we are concerned with what may effect any part of the organism. We have then to consider every part of a child's environment during school life and the hygienic conditions of work in the schoolroom. This brings us to the subject of school hygiene in the special sense.

VI.—Location of Schoolhouse and Architecture.

The subject of school hygiene naturally begins with a consideration of the externals of the school — the location of the schoolhouse, its construction, furniture, and the like. All the conditions necessary for a healthy dwellinghouse are requisite in still greater degree for a schoolhouse, since in the latter there is likely to be a collection of persons in a more limited space.

The site for a schoolhouse must, of course, be chosen carefully. The ground should not only be well drained, but it should not be impregnated with organic material to any great degree. Experiments upon the relation of the circulation of the air to the *permeability* of the soil have shown that not only the physical and chemical character of the soil, but also the change of temperature by day and night, meteorological conditions, wind and frost, are all factors which help determine the exhalation from the soil; and hence must all be considered in choosing a location for a schoolhouse. There is not only danger in the exhalations from a soil impregnated in great degree with organic material, but, of course, the water is likely to be polluted. When the ideal schoolhouse is built, an expert chemist and other specialists will first test the soil of the sites proposed and the permeability of the underlying

strata. Again the schoolhouse should not be situated in a narrow street nor very near to large buildings. Javal's rule is that the distance of the neighboring buildings should be equal to twice their height. Dr. Cohn([97—p. 101.]) says that when he tested the eyes of so many school children 25 years ago, he found in the gloomy schoolhouses on the narrow streets from 8 to 15 per cent. of the children near-sighted, while in the sunny schoolhouses situated on the broad streets near the gates of the city only from 2 to 7 per cent. were near-sighted. This, he says, could not be a matter of chance; for he visited 20 schools and examined about 5,000 children.

Without going into details, the main points to be considered may be given as summarized by Eulenberg and Bach([22—p. 77.]):

1. The ground must consist of soil free from all foreign admixtures and be pervious to water and air.

2. The soil must be natural, that is, it must not have been worked over by the hand of man.

3. In the larger cities, if refuse has accumulated, it must be completely removed until one comes to the natural earth, since, soil full of refuse, is never good for building purposes, and, on account of its content of rotten organic matter, it needs sanitary care, and ultimately is liable to injure wells in the vicinity.

4. The soils recommended are gravel, sand, sandy clay, and marl containing lime and dolomite. Of other constituents those are most suitable, which contain a larger proportion of sand and less of clay. In general, the more clayey the soil, the more is it to be rejected as building ground, on account of its coldness and moisture.

5. The soil must be dry; the ground must be leveled; there must be some slope to facilitate drainage; the place must not be limited, but must be free, and if possible, somewhat elevated, in order to admit light from all sides. There must not be a large amount of ground-water. If there are no reports relating to hydrometric determinations for the city, borings must be made to determine the nature of the soil. If one is compelled to choose moist ground, there must be adequate drainage, positively to ensure dryness. Of course, the locality must be well above high water mark.

6. Free surroundings, furnishing abundance of light and air, are necessary, hence the neighborhood of high buildings must be avoided. Reflected light from the white walls of neighboring houses is injurious, and is likely to cause dazzling. Every limitation of the ground by narrow streets etc. is to be avoided, especialty in cities.

7. Likewise the locality must be removed from industries

that are noisy or that cause injurious exhalations, from markets, hotels, barracks, and every other noisy occupation which might disturb instruction.

8. In the country, care must be taken in choosing a locality that there be no swamps, ponds, or standing water in the neighborhood.

9. Other things being equal, the location should be in the centre of the district. In large cities a different location may, however, be unavoidable and even desirable on account of the increased means of communication and the moral advantage of being removed from the life of the streets. But in the country long walks are more dangerous on account of exposure to the weather.

10. The size of the ground depends upon the school, whether high or elementary. If there is no gymnasium, there should be a covered open space. In determining the size of the ground, possible enlargement of the buildings and place for a playground or an athletic ground should be considered. For each pupil three square metres is necessary to meet all demands for play. In a free athlectic ground, trees at a sufficient distance from the schoolhouse will serve as a protection against the sun. Chestnuts, lindens, and elms are best. The playground must have a solid surface covered with gravel and somewhat sloping. To these demands, it may be added that a garden should be included in the school grounds.

The literature and important points in regard to the architecture of school buildings have already been given in the PEDAGOGICAL SEMINARY, Vol. I, No. 3, and reference should be made to the works of Barnard([23]), Klassen([24]), Hittenkofer([25]), Hinträger([26]), Baginsky([27]), Marble([28]), and of Eulenberg and Bach([22]). Without entering into details, a few points may be mentioned. School buildings should not be more than two, or at the most, three stories high. In case of very large buildings, they may advantageously be built around large open quadrangles, like those of the admirable Lycée Janson de Sailly in Paris. The entire building should be under-cellared. The cellar should be thoroughly ventilated and should not contain the water-closets. The floor of the cellar should be cemented. A water-table may advantageously be placed around the building, and isolating layers should be used to prevent moisture. The lower floor should be at least a foot and a half above the surface of the ground. The walls should contain vertical air-chambers. The floors and ceiling should contain sound-deadening layers. The roof, if not the entire building, should be fire-proof. Hard, splinterless, oiled boards are good material for the floors and stair-

ways. The halls should be large; the stairways, wide, light, ventilated, broken by landings, and of fire-proof material. The steps should not be more than 8 inches high and hand-rails should be provided on both sides. The water-closets must be ample and constructed by an expert. A properly constructed system of dry closets may be used([28]). Other important points will be mentioned in succeeding sections. A number of uew buildings in Europe and America are, in many respect, models. (See the PED. SEM. I, No. 3, pp. 432-437.)

VII.—HEATING AND VENTILATION.

Expired air consists chiefly of watery vapor, carbonic dioxide (CO_2), and organic matter. CO_2 in large quantities is, of course, a deadly poison, and popular opinion looks upon this as the dangerous element in foul air. But specialists do not deem the CO_2, even in the worst ventilated rooms, really dangerous. In places where soda fountains are charged, in some rooms in breweries, and at some health resorts, people stay without discomfort in atmosphere where the amount of carbonic acid gas is perhaps as great as 150 parts in 10,000. According to the experiments of Le Blanc([27—p. 151.]), a person may remain for a few minutes in an atmosphere containing 30% of carbonic acid without danger to life. And Robert August Smith([27—p 151.]) made certain experiments which showed that in an air-tight chamber, where the air contained only 17.45% oxygen, in spite of the pressure which this air caused, it was not as disagreeable as in a crowded school-room, so that we must assume, says Baginsky([27—p. 151.]), that the unpleasant sensations are not due to lack of oxygen nor to the large amount of carbonic acid, but to the organic substances mixed with the air. According to Dr. Billings([29—p. 20.]), there is no evidence that CO_2, in the proportions in which it is present, even in the worst ventilated rooms, is injurious.

Another popular idea is that this gas, being heavier than the air, sinks. The fact is that carbonic acid gas, like any other gas, mixes with the other constituents of the air according to the law of the diffusion of gases. The amount of CO_2 in the atmosphere is said to be substantially the same at the sea level that it is ten miles above. If CO is introduced at the bottom of a tall glass jar containing ordinary air, in a short time the carbonic acid gas has diffused upward and the air downward until the amount of CO_2 is the same in all parts. It is the same with the CO_2 in a room. Only, under certain conditions, due to the currents in the room, the carbonic acid gas rises, especially since it is generally introduced from respiration and lights in a mixture at a higher tempera-

ture than that of the atmosphere of the room. But when it cools, it diffuses throughout the room, so that the proportion is no greater in one part than in another. Supt. Marble([28]—p. 11.) cites the case of a schoolroom that was left sweet at night and found in the morning filled with the odor of expired air due to a stratum of impure air left in the arch above the cornice. This foul air cooled at night and was diffused through the whole mass. CO_2 then, does not settle at the bottom of the room; and, in small quantities, it is not immediately dangerous.

What, then, constitutes the danger from foul air? It is the organic matter present in it. The lungs and skin exhale a powerful poison. The quantity is very small, but, where two or three persons are together in a confined space, it is sufficient to infect the air very quickly. While the exact nature of this organic matter is a subject of dispute, it is evident that this human miasma is the really dangerous element in expired air.

The presence of organic matter in the air may be detected in many ways. The simplest method is to notice the odor. Everybody knows the stuffy smell of an unventilated room. For more reliable and scientific tests, the air may be subjected to microscopic examination. The presence of organic matter may be detected by forcing some of the air through strong sulphuric acid; since the organic matter will turn the acid dark. Uffelmann([45]—p. 65.)has a method by which he determines the impurity by the amount of oxygen necessary to oxydize the organic matter present. All such methods, however, are too difficult for practical purposes. An easier method, and the one generally employed, is to test the amount of organic matter indirectly. The amount is generally directly proportional to the amount of expired air; and the CO_2 measures the amount of expired air. Hence the CO_2, although comparatively harmless itself, is a good index of the impurity of the air, since, as Dr. Billings says, it is usually found in bad company. For convenience, then, the degree of impurity of the air is usually measured in terms of CO_2; but, of course, the air may be very bad as in a sick room or hospital, when there is not an excess of CO_2. A number of simple methods of testing the amount of CO_2 have been invented([46 and 22]—p. 272.).

What, then, is the limit of impurity of the air, as measured in terms of CO_2, that may be safely allowed in a schoolroom? The experiments of De Chaumont and others have answered this question roughly, and have shown the amount of fresh air that must be provided. When the CO_2 in the air exceeds 4 parts in 10,000, or, at the most, 6 parts in 10,000, the amount of organic matter exceeds the limit of safety. On this basis, Corfield([30]) makes the following estimate: "Now

since each individual on an average expires .6 (or 3 times .2) of a cubic foot of carbonic acid in an hour, it follows that the air he breathes out must be diluted with 3,000 cubic feet of pure air, so that the carbonic acid in it may be reduced to the above limit of respiratory impurity. . . . . If the air is only changed three times per hour, each individual will require to have 1,000 cubic feet of air space. If it can be changed four times per hour, 750 cubic feet of space for each person will be sufficient to ensure the requisite supply of 3,000 cubic feet per head. The quantities allowed in public lodging-houses, etc., are much smaller than these, but anything below 300 cubic feet per head is usually considered to constitute overcrowding—300 feet for adults per head, with a somewhat smaller allowance for children." These minima apply, of course, only in case of rooms that are not lighted. As an ordinary lamp consumes as much oxygen as a man and an ordinary gas-burner as much as several persons, and since the burning gas gives out injurious products of combustion, it is necessary to have much more air-space or more frequent change of air in a room that is lighted.

De Chaumont took as a starting-point the investigations of Pettenkofer, which showed that a man at rest exhales 266 c. c. m. of CO_2 per hour for every kilogramme of his weight. Taking the average weight of children at different ages from Quetelet's tables, and making allowance for increase due to movement and the like, he estimated the amount of air-space per pupil, and the amount of pure air that should be supplied per hour for pupils of different ages. His estimates are shown in the following table:

Ages.	Cubic Metres of pure air to be supplied per hour.	Cubic Air-Space.	No. of pupils for a room containing 315 Cubic Metres.
4 years	25.960	8.650	33
5 "	28.890	9.630	30
6 "	31.320	10.440	28
7 "	34.890	11.630	25
8 "	38.510	12.840	23
9 "	41.670	13.890	21
10 "	45.200	15.060	19
11 "	48.200	16.070	18
12 "	53.630	17.880	16
13 "	61.100	20.370	14
14 "	70.060	23.350	12
16 "	92.200	30.730	9
Adults	118.140	39.380	7

Dr. Billings([29—p. 162.]) criticises these estimates, and would allow nearly the same air-supply for all children over 5 years of age. The difference in the amount of organic matter excreted, is, he thinks, not as great between children of 5 and children of 15 as is indicated by the carbonic acid test. In his opinion, there should be 15 sq. ft. of floor area, and 30 cu. ft of air per minute, for each pupil. It is interesting to note some of the norms of other countries in regard to this point.

According to M. de Chaumont's report([29—p. 163.]) at the International Congress of Education at Brussels in 1880, Belgium prescribed one square meter of floor-space and 4.5 cubic meters of air-space to each scholar; but the Educational League of Belgium, in the plans of its model schools, proposed 1.67 sq. m. of floor-space and 9.6 cu. m. of air-space to each pupil. In Holland the average was 3.727 cu. m.; but in 89 schools in Haarlem the average per head was 4.54 cu. m. In England, in the Board Schools, about 1 sq. m. of floor-space and from 3.65 to 4.25 cu. m. of air-space were allowed. Bavaria prescribed 3.9 cu. m. for scholars of eight years, and 5.6 cu. m. for those of 12 years. In Sweden, in the primary schools 1.52

sq. m. and 5.35 to 7.55 cu. m.; in the higher schools 2.17 sq. m. and 7.69 to 9.98 cu. m. per head were allowed. In Switzerland the regulations vary in different cities. In Berne a sub-committee of the Police Directors([31]) reported two or three years ago in favor of 4 cu. m. per pupil under ten, 5.5 cu. m. for pupils over ten; in all cases 1 sq. m. of floor-space. In some schools as much as 6.50 cu. m. of air-space per child is required([25]). In Austria([26]) 0.6 sq. m. and 3.8 to 4.5 cu. m. are required. In the country schools in Prussia([22—p. 167.]) a floor-area for each pupil of at least 0.64 to 0.74 sq. m. and a height of 3.20 m.—therefore at least 2 to 2.37 cu. m. of air-space—are provided. In the higher schools from 3.9 to 5.2 cu. m. are required.([33—I, p. 44.]) In Württemberg from 3 to 5 cu. m., in Hesse and Baden 3 cu. m. are prescribed for each pupil.

Investigations by the Brooklyn Board of Education, a few years ago, of the space allowed per pupil in various cities in this country, showed that the requirements varied from 5 to 20 sq. ft. (.045 to 1.81 sq. m.), and from 70 to 300 cu. ft. (1.98 to 8.5 cu. m.), per pupil. For example, Boston required 14 to 16 sq. ft. and 175 to 200 cu. ft. per pupil; Worcester 20 sq. ft. and 240 cu. ft.; Chicago 14 sq. ft. and 225 cu. ft.; Washington 10 to 15 sq. ft. and 150 to 250 cu. ft.; Philadelphia 66 to 272 cu. ft.; and New York from 5 to 9 sq. ft. and from 70 to 100 cu. ft. In Ontario the Education Department requires 12 sq. ft. and 120 cu. ft. "for each of two-thirds of all in the section or district of school age."

The air-space per pupil actually found in the schoolrooms is often less than the prescribed minimum. In New York city, while the prescribed norms are far too low, the space allowed each pupil is sometimes still less. Even in Switzerland, where the prescribed norms are unusually high, some of the schools are crowded. E. Lüthi([48—II, p. 552.]) states that of the 1,946 schools in the canton of Berne, there are 200 schools where the air-space amounts to only one half a cu. m. per pupil, 300 with 2 to 2.5 cu. m. per pupil, 320 with only 2.5 to 3 cu. m. per pupil, and 690 others with only from 3 to 4.5 cu. m. per pupil. Only 7.5 per cent. of the schoolrooms had arrangements for ventilation; in 360 classes the windows could not be opened. Only a seventh part of the schoolrooms had sufficient air, and about 80,000 children must attend school at the expense of their health.

Most new school-buildings, however, both in this country and in Europe, seem to allow a fair amount of space, and sometimes the amount of space exceeds the prescribed norm. For example, in the *Charlotten-Schule* in Berlin([27—p. 80.]), the average cubic air-space per pupil is 4.64 cu. m. in the rooms on the ground-floor; 4.64 cu. m. in the rooms of the second

story; 4.73 cu. m. on the third floor, and 5.42 cu. m. on the fourth. And in the *Falk-Realgymnasium* the air-space per pupil is 4.68 cu. m. in the rooms on the ground-floor; 4.43 cu. m. on the second floor; 5.21 cu. m. on the third, and 5.72 cu. m. on the fourth. In some American schoolhouses the cubic air-space per pupil is still more.

Above a certain minimum, say 16 sq. ft. and 225 cu. ft., the amount of air-space per pupil is not as important as the efficiency of ventilation. While most modern schoolhouses allow a fair amount of space per head, the actual condition of the air is generally very bad. The schoolhouses that are properly ventilated are so few that one is inclined to agree with Dr. Billings, that all schoolhouses are bad although some are worse than others.

Many tests of the air in schoolrooms, both in this country and in Europe, have been made.([27 & 52]) The results of a few of these tests are as follows: Pettenkofer([27—p. 146]) in 1857 made determinations of the amount of carbonic acid gas in Liebig's lecture-room at Munich. The hall, which had an air-space of 46,000 cubic feet, with seats for 250 hearers, was crowded, and contained about 300 persons. The amount of CO_2 found was as follows: at 6 P. M. 10.8, at 6.30 P. M. 22.6, at 7 P. M. 32.2 parts to 10,000. In a room used by students as a *Kneipzimmer*, he found the ratio of carbonic acid from 38 to 49 parts in 10,000. In a schoolroom where there were 70 pupils, from the ages of seven to ten, after two hours the ratio of carbonic acid was 72 parts to 10,000. Afterwards Baring tested the air in the schoolrooms in Celle, and found in the People's School, usually, over 90 parts—in one, even as high as 120 parts in 10,000; while air in the class-rooms of the *Gymnasien* contained from 20 to 50 parts to 10,000. Breiting tested the air in the schools at Basel. The result of his experiments is shown in the following table ([27—p. 148]):

Time of the Test.			Amount Carbonic Acid.
7.45	A. M.,	before school,	22.1 parts to 10,000.
8.00	"	at beginning school,	24.8 " " "
9.00	"	end of first hour,	48.0 " " "
9.00	"	after recess,	47.0 " " "
10.00	"	before recess,	68.7 " " "
10.00	"	after recess,	62.3 " " "
11.00	"	end of the hour,	81.1 " " "
11.00	"	in empty room,	73.0 " " "
1.45	P. M.,	before the hour,	52.0 " " "
2.00	"	beginning of hour,	55.2 " " "
3.00	"	before recess,	76.0 " " "
3.00	"	after recess,	64.6 " " "
4.00	"	end of the hour,	93.6 " " "
4.00	"	in empty room,	57.2 " " "

The room tested contained 64 pupils and 251.61 cubic meters of air-space. The increase in CO_2 during the hours of study and the decrease during the recesses is shown still more strikingly by the tests in Russian schools made by Boubnoff and Ignatjeff.(84—p. 401.)

Hesse, who tested the air in several schools in Saxony, making determinations every ten minutes, found 80 parts to 10,000. Mr. W. R. Nichols tested the air in 39 Boston schoolhouses and found 15.6 parts of CO_2 in 10,000; and Mr. R. C. Kedzie found the ratio 22.9 to 10,000 in 46 schoolrooms in Michigan. Tests by Schwarzenbach, Krause, Rietschel, and others,(52—p. 375.) have shown similar results. The large number of bacteria also in the air of schoolrooms has been shown by the investigations of Hesse and others(22 — p. 277).

Recalling that 4 parts of CO_2 in 10,000 is the ratio of pure air, the significance of these figures is apparent. They show a worse condition of the air than in the worst prison-cells investigated by Dr. Chaumont.(86—p. 115) The cells in the Aldershot Military prison showed 34.8 parts to 10,000; and the cells of the Chatham Convict Prison about 31 parts to 10,000. Rietschel's (25—p. 270) investigations of the schoolhouses in Berlin showed that the air was bad with various systems of heating. In a class of the *Friedrich-Wilhelm-Gymnasium*, with 3 cu. m. air-space per child, and stove-heating without ventilation, he found the maximum amount of CO_2 to be 97 parts in 10,000. In another room of the same *Gymnasium*, with water-heat, and ventilation by windows and blinds in the doors, the maximum CO_2 was 48 parts in 10,000. And in a room of the *Louisen-Gymnasium* with 4.61 cu. m. air-space per head, with hot-air heat, and ventilation by aspiration through a shaft at the top of the room, the maximum was 19 parts. His investigations showed, too, that a larger air-space per pupil was not sufficient without proper ventilation. In a class-room of one gymnasium, where there were 6.87 cu. m. air-space per pupil and artificial ventilation, the maximum CO_2 amounted to 22 and 23 parts in 10,000.

From the foregoing observations it appears that the bad air in schoolrooms is due rather to defects of ventilation than to lack of air-space. While the air-space per pupil should be increased rather than diminished, the main point in most of our schoolhouses is to provide some adequate system of ventilation. Whatever the cubic contents of the room, any system is inadequate which does not furnish at least 30 cu. ft. of air per minute to each person. The mechanics of ventilation is a very complicated subject, and cannot be treated in this article. For a practical presentation of the important points,

the excellent book by Dr. Billings,([29]) already referred to, should be consulted. Only a few important points can be mentioned here.

Remembering that the organic matter in expired air is the dangerous element, that under uniform conditions of temperature and with freedom from currents the bad air slowly diffuses throughout the room, it is evident that the entire atmosphere of the room must be changed. Air is a substance having weight: and just as much force is required to lift 1000 pounds of air 50 feet as to lift 1000 pounds of iron or any other substance the same distance. Hence, the ventilation of a room implies that work is to be done and that expenditure of energy is required. The work may be done in three ways ([28—p. 518.]): (1) By taking advantage of the ordinary currents of air; (2) By supplementing the ordinary currents by movement caused by generating heat in flues or chimneys; (3) By direct propulsion of the air, by fans or the like, either to force it into the room or to draw it from it. In small houses the first two methods may suffice; in large buildings some artificial method is usually necessary.

It is evident that the problem of ventilation cannot be considered apart from that of heating. The system of heating adopted must, of course, depend largely upon local conditions; but, fortunately, there are several systems that are good. It cannot be maintained that any one system is absolutely best. In a small room, when the weather is not severe, nothing is better than an open fireplace; and, as a means of ventilation, it may often be advantageously used in connection with some other method of heating. But a great amount of heat is wasted ([39]), and the comfort and cheer of a fireplace is generally deemed too expensive for a schoolroom. The City of London High School, however, is warmed and ventilated by a fireplace.([40—p. 111]) Where a stove must be used, as in most country schools, a "jacketed" stove should always be chosen. The Red Rock Street Schoolhouse in Lynn, Mass., is heated in this way with good results.([28—p. 67]) Fresh air is introduced between the stove and the jacket by a flue extending to the outer air. This air passes up between the stove and the jacket, is diffused throughout the room, and the bad air is carried off by extraction flues in the rear.

Windows are made to admit light rather than air; but where they are the only means of ventilation, each room must be considered by itself and each day presents its own individual problem, dependent upon the temperature, the direction and velocity of the wind, and the position of the stove in relation to the windows. To secure good ventilation by windows, they should be on two sides of the room; double

windows should be used in cold weather; and constant regard should be had to the laws of air-currents.

Of heating by hot air, hot water, and steam, it may be said that any one of these methods may be used if combined with suitable means of ventilation. For a small building the hot-air furnace may be best. But it should never be so small that on very cold days it is necessary to heat it red-hot.

One of the most careful attempts to combine heating and ventilation in the use of a hot-air furnace, is the Ruttan System. This system, when correctly employed, seems to be a very good one. A modification of this—the Smead System—is used in many schoolhouses in this country and in Canada; and, from reports that I have received, it seems to be satisfactory; but, like any other system, it requires constant care and careful management.

With steam or hot water, there are two methods: local heating, and central heating. With the former, radiators are placed in the rooms, and the air is heated directly. With the latter, pure air is passed over the steam or hot-water pipes in a central room, and then conveyed to the different rooms which are to be warmed. The former, the local system, is used where school houses are heated in the interest of the tax-payers; the latter, the central system, when they are heated in the interest of the children. Steam and hot water both, offer advantages for distributing heat. The first cost of steam is less; and it is said to be easier to plan and set up a steam-heating apparatus that will work. With hot water, a uniform temperature may be secured, and it is easier to adjust the amount of heat to the requirements of our changing climate. But as school-buildings are occupied only a portion of the time, many prefer steam-heat. With hot water, the heat continues to radiate for a long time after the necessity for it is over; so they deem this heat wasted in a schoolroom. If hot water is used, it should be the low-pressure system. The Berlin school authorities have recently resolved to introduce the low-pressure system of hot-water heating.(22—p. 258)

While several different systems of heating and ventilation are good (provided they are correctly operated), in regard to many points upon which advice is frequently given, no very definite rules can be formulated. For example, should fresh air be introduced at the top of the room, and bad air be let out at the bottom, or *vice versa?* The answer to this question depends upon whether we wish to ventilate our room, to cool it, or to warm it; upon the heating apparatus employed; upon the position of the windows, and so on. In winter, if fresh, warm air can be introduced in suffi-

cient quantities at the top, then the bad air should be drawn out at the bottom of the room. If, on the other hand, fresh air is introduced through a perforated floor, as in the Houses of Parliament, the bad air should be let out at the top of the room. The best rule for a schoolroom where there is only one inlet and one outlet, is, perhaps, to introduce warm, fresh air near the top of the room, and exhaust the bad air by an outlet near the floor on the same side. This plan has been successfully employed in the Bridgeport (Conn.) High School([22–p. 167]). The air enters the inner corner of the room about eight feet above the floor, and is exhausted at the floor in the same corner. Hittenkofer([25 – p. 46]) and others give diagrams that illustrate other points.

In this country, it seems necessary to have the temperature of the schoolroom nearly 70°F. It should never exceed this; and, with adequate ventilation, may be less. Mr. Rafter ([42–p. 27]) investigated the temperature in the schoolhouses in Rochester some years ago. By a preliminary test, he found great variations in temperature in different rooms. "The schoolrooms, numbering more than two hundred, were then supplied with thermometers, and the teachers carefully instructed as to the manner of taking observations, etc. The observations were taken ten times a day for one week." His observations led to the conclusion that "the temperatures invariably increase as perfection in ventilation decreases." In well-ventilated rooms, where the temperature ranged from 62° to 66°, the teachers usually testified that they found the rooms too warm when much above 66°.

Another point of importance concerns the humidity of the air. Experiments made by De Chaumont and others indicate that in England the moisture in air of standard purity is about 73 per cent. of saturation. Investigations in this country indicate that the humidity in pure air in our climate is much less. The relative humidity is what we are concerned with; and this changes with the temperature. Heating the air increases its capacity for moisture and decreases its relative humidity, although the absolute humidity remains the same as previous to the heating. European writers often state that the amount of moisture in the air should be from 65 to 75% of saturation; but a less amount is sufficient in this country.

Such are some of the main principles of heating and ventilation. No adequate treatment can be given in limited space. There is a great amount of literature upon the subject. Baginsky gives a bibliography of four pages. The works([23, 26, 28, 29]) already referred to give the most essential points. One thing at least should be evident from what has already been

said, namely, that it is necessary to entrust the work of setting up the apparatus for heating and ventilation to an expert; and, as Dr. Billings([29] – p. 214) well says, "it should be remembered and impressed on the managers of public institutions, that every system of heating and ventilating apparatus requires constant care as to its cleanliness, efficiency, and adjustment to the demands of the season and the hour, to produce the best results, and that the most wasteful of all expenditure is to provide an elaborate and costly apparatus, and then entrust it to the care of an ignorant or careless engineer, on the ground that he is somebody's 'nephew,' or is 'an active politician.'"

As a résumé, it may be well to recount briefly the negative rules that have been established. An ordinary stove, with no means of ventilation but windows, should never be used. Steam radiators and the like should never be placed in a schoolroom. When fresh, warm air is introduced into a room, the foul air register must not be placed above the warm register. Not less than 30 cubic feet of air per minute should be supplied to each pupil. The amount of air-space necessary depends upon the efficiency of the means of ventilation. Air that is to be introduced into a schoolroom should never be heated above 100 degrees Fahrenheit, and a much lower temperature would be better. The temperature in a schoolroom should not be allowed to exceed 70°; and, in well-ventilated rooms, the temperature can be kept lower without discomfort. A schoolroom should never be cooled below the dew-point by opening windows and doors during the intermission. All the air in a schoolroom should be moved. The room should be so arranged that there will be no unventilated places, or dead points, as the Germans call them. In the interest of the tax-payers, rooms should not be more than fourteen feet high. One or two good features are not enough in a system of heating. All the essential points must be considered.

It is unnecessary to speak of the dangers of impure air. Its disease-producing power has been amply shown. But where actual disease does not result, the detriment to study is so great that for pedagogical reasons alone the necessity of pure air in the schoolroom should be insisted upon. Morrison says that, "in a comfortable atmosphere of proper temperature and purity as much mental labor can be accomplished in one hour as can be accomplished in six in an atmosphere rendered impure by respiration." In the case of most persons, this would be an exaggeration; but probably a large amount of the stupidity, listlessness, and disease among school children is caused by the bad air of the schoolroom. In many schools it is doubtful if anything would do so much toward solving

pressing educational problems as a suitable means of warming them combined with an adequate supply of fresh air. One can exist without fresh air, but one cannot work without it.

VIII.—Lighting.

In regard to lighting, four points should be considered, namely: the quantity of the light, the direction of the light, the color of the light, and the kind of light. As to the quantity, Dr. Cohn ([21] – p. 133) maintains that there can never be too much light in a school. Javal, too, insists that "the schoolroom must be flooded with light, so that the darkest place in the class may have light enough on a dark day." In the Microscopic Hall in the Pathological and Anatomical Institute at Breslau, there are 23.20 square metres of glass surface to 62.64 square metres of floor. Dr. Cohn ([21] – p. 128) rightly says that "children, who are learning to read and write, need just as much light as students learning to use the microscope." The amount usually deemed sufficient is indicated by the norms of different countries. At the Paris Exhibition in 1867, Dr. Cohn ([21] – p. 134) found in the Prussian schoolroom only 16.7 inches of glass to each foot of floor-space. The Americans scored a point there. In the American schoolroom there were 32.2 inches to one foot. At the Vienna Exhibition in 1873, only in the Swedish schoolroom did he find 32 inches to one foot of floor-space, while the American had fallen off to 20.6 inches per foot, although the model for the Franklin School at Washington had 52.8 inches to one foot of floor-space. According to the regulations in Württemberg, Saxony, Baden, and Hesse, the window-surface in a schoolroom must be at least $\frac{1}{6}$ of the floor-space. In Prussia, according to the decree of Jan. 14, 1888, it must be about $\frac{1}{5}$ ([22]–p. 174); in Switzerland the rule is $\frac{1}{4}$ or at least $\frac{1}{5}$ ([21,43]–p. 24). The ratio of window-surface to floor-surface in several of the best lighted German and Swiss schools is as follows ([27] – p. 89): One square metre of window-surface to 5.24 square metres of floor-surface in the *Charlotten Schule;* 1 to 4.90 in the 87/98 *Gemeinde-Schule;* 1 to 4.63 in the 123 *Gemeinde-Schule;* 1 to 3.00 in the *MünchenbucherLehrerseminar* in Berne; 1 to 3.3 to 14.9 in the *Töchterschule* in Basle. Dr. Billings ([29] – p. 164) maintains that the ratio should be 1 sq. m. of window-surface to 4 sq. m. of floor-surface.

There must, of course, be plenty of light at each desk irrespective of this ratio; and hence photometric measurements([21]) should be made in every schoolroom. Dr. Leonard Weber invented, in 1883, a photometer, by which one can determine in a minute the amount of light at any pupil's

place. The standard of measurement is the "meter-candle," *i. e.*, the amount of brightness cast on a paper exposed to a *normal* candle one meter distant. Spermaceti candles, weighing a sixth of a pound, are taken as *normal*. Dr. Cohn's estimate is usually taken as the standard, at least in Germany. The minimum brightness on dull days for any seat should be ten normal metre-candles. Weber([21] – p. 152) has also invented a stereogoniometer, by which one can quickly measure the the whole piece of sky visible. If one has no photometer, the amount of light may be roughly tested by asking each pupil whether he can see the sky. Or better, by testing children with normal eyes upon Snellen types. A room is well lighted when, at all the desks, there is light enough on a dark day so that the pupil can read a small diamond type at the distance of thirty centimeters. Or, according to Von Hoffman's method, the light is insufficient when a normal eye cannot read the Snellen type No. 6 at a distance of six meters. In 1882, a committee, convoked by the Minister of Public Instruction in France, investigated the lighting of schoolrooms, and reported that every scholar should be in a position to see a piece of the sky corresponding in size to a window-space of at least 30 centimeters length measured from the upper edge of the upper window.

To ensure this amount of light, it would probably be necessary to follow Javal's rule, that, if the schoolhouse *must* be built near other buildings, "the distance of the opposite buildings should be equal to twice their height."

In regard to the direction of the light, there is some conflict of opinion. Some would have a room lighted from above others from the side. Again some would have the windows only on one side, others say they should be on two sides. Most German writers favor unilateral lighting. Javal favors bilateral.([43] – p. 21) At least more light should come from one side, and with seats arranged so that this light comes from the left. The objection to bilateral lighting from the left and rear is that the light from the rear is liable to trouble the teachers; but by curtains and the like this difficulty can be avoided. All are agreed, however, that unilateral lighting from the right is bad; but the way this unanimously accepted opinion is ignored gives striking illustration of the great gulf fixed between hygienic science and school-practice. In the physiological lecture room in Würzburg for twenty-four years, the desks were so arranged that the light would fall from the right. "No doubt," says Ellinger([21] – p. 123), "in this lecture room once a year was expounded the well-known proposition about the intensity of light and the square of the distance, and the consequence was deduced that if the paper

is thrown into shadow, a larger retinal picture is required, and, therefore, a nearer approach of the eye to the paper, and that not in simple but in duplicate ratio." With unilateral lighting, the bottom of the windows should be about a meter above the floor. The windows should be as near together as possible, and should extend to the top of the room. Cohn, Javal, and others maintain that the ideal plan is to have a glass roof. Eulenberg and Bach speak of the method of lighting from above as to be found only in schools in North America. I am not aware that it is used in any public school in the United States.

The influence of differently colored light upon the eye has not received adequate attention. Dr. Bœhm([38] – p. 381) has ardently advocated blue light. He observed the work of some fifty women in an embroidering establishment in Berlin where silks and satins of different colors were used. Yellow, and especially apple green, were the colors with which continued visual effort was most difficult. The color most pleasant to work upon was said to be blue, although long-continued work upon it was said to produce headache. Every-day experience also indicates that blue, gray, and light shades of lavender and green are pleasant to the eye.

Different colors also tend to call up different emotions as was shown by Dr. Scripture's([54]) experiments where he showed a color, and the subject mentioned the emotion suggested. Féré([5–II, p. 379]) found that sensations from lights of different colors reinforce the power of muscular contraction in varying degrees; blue and green having least dynamogenic value, orange and red most. These results likewise corroborate ordinary observation that orange and red are exciting colors. All these points should be considered, but so little data has been collected that only general rules can be given. The consensus of opinion seems to be that the walls of the schoolroom should be gray or a light shade of blue or green.

Indirect sunlight is the best kind of light; but it should be regulated by blinds or ground glass. When artificial light is necessary, it should be indirect, similar to diffuse sunlight. Erisman([24–p. 356]) deems indirect lighting practicable. The electric light should, if possible, be used. The incandescent light gives practically no heat and consumes no oxygen. It is steady and safe. And Dr. Cohn([21 – p. 170]) thinks he has proved that the effect of the electric light upon acuity of vision and the power of recognizing colors is more favorable than that of gas. The alleged dazzling by electric light, in Dr. Cohn's opinion, is a sort of legend. If one does not look at the light, it has no defect except its jerking, and this is obviated by using the proper improvements. Dr. Cohn exam-

ined the eyes of workmen in a sugar refinery where an intense electric light had been used all night long for four years, and he found no diseased eyes. Apart from the danger of fire, apparently the only objection to the use of the electric light is the purely theoretical one that, being rich in the ultra-violet rays, by which chemical and vital action are supposed to be promoted, it might give a sufficient stimulus to vital processes to quicken the pace of living, and hence lead to early exhaustion. But there have been no complaints upon this point, and, as Carter ([38 – p. 411]) says, we have not yet had sufficient experience with the use of the light to determine this point. In the present state of our knowledge, Dr. Cohn seems to be right in his prophecy, that, in the school of the future, the electric light alone will be used for artificial illumination.

The light in schoolrooms is very apt to be deficient, because officials do not realize that light diminishes, not as the distance, but as the square of the distance. Dr. Cohn and others have made careful measurements of the degree of light in different schools in Germany. Dr. Cohn ([21—p. 149]) measured the daylight in seventy classrooms of four high schools in Breslau. The measurements were taken from nine to eleven o'clock. The lightest place at which a scholar could sit, and also the darkest, were chosen. The measurements were taken twice in each classroom; once on a very clear morning and once on a very dark and cloudy morning. Only one school did he find well lighted in every part. In two *Gymnasien* the best places in twenty-five classrooms had only a brightness of from two to ninety-eight candles; and in thirteen classrooms the light in the dark places was less than one metre-candle on dull days. In these same schools, 2,416 scholars were questioned and 459 of them could not see the least bit of sky.

Dr. Wachs ([43—II, p. 571]) tested the degree of light in several schools in Rostock, using Weber's stereogoniometer and Snellen types. Many classrooms he found insufficiently lighted, the ratio of window-surface to floor-surface being too small, high buildings being in the neighborhood, or the pupils being seated too far from the windows. From the result of his tests he agrees with Dr. Cohn that the smallest space-angle for any place should be fifty "square degrees." C. Huth ([43—I, p. 457]) and E. Gillert ([43—IV, p. 149]) also, have made photometric determinations by similar methods in Berlin schools. No systematic photometric determinations, so far as I know, have been made in this country.

IX.—Cleanliness and School Baths.

Reference has already been made to the bacteriological researches of Hesse ([22—p. 277]). He found in the Berlin schools

an average of 14,990 microbes per cu. m. of air. Ignatjeff ([48–I, p. 404]) found an average of 14,833 to 20,625 per cu. m. of air in the Russian schools, and estimated that each child inhaled over 40,000 of these microbes during the daily school-session. It would be rash to take the number of bacteria found as an index of the purity of the air; but the large number found does emphasize the importance of cleanliness, for dirt furnishes the condition in which bacteria thrive. Dr. Cohn([37]) cites the experience of Dr. Stern, who wished to get a large quantity of dust for bacteriological research in the Hygienic Institute at Breslau. He could not get the desired amount at the university, but succeeded at the public schools, and investigation showed that it contained large quantities of bacilli. Dr. Cohn adds, with excellent satire, that without this dust Dr. Stern's experiments would have been impossible; and he predicts that in the school of the future there will be no dry sweeping, but the rooms will be washed daily with a weak solution of sublimate. The dust which collects is dangerous to health also, since the inorganic matter in it irritates the mucous membrane. Schmidt-Rimpler ([44–p. 87]) attributes many cases of disease of the eyelids to dust in the air of the schoolroom. In the interest of morals, too, cleanliness is imperative.

Rules for cleaning a schoolroom are likely to seem platitudes, and little space is usually given to the subject in works on school hygiene. Hoffmann([44–p. 35]), however, has treated the subject with some detail. His words, though they may be truisms, are too important to be ignored. He maintains that special care should be given to keeping clean, not only the schoolroom and apparatus, but the clothes of the children. First of all, care must be taken that as little dust as possible be brought into the schoolroom. Some kind of large trellis-mat should be placed before the door. But in spite of all precautions, dust from the feet, clothes, chalk, and the like, will accumulate in the schoolroom. Dry sweeping is bad since it merely stirs up the dust and makes it change place. Moist sawdust or the like should be placed on the floor before sweeping. The floors must be frequently washed before school and after the longer recesses. The seats should be dusted with a moist cloth; special care must be given to keep the blackboards, charts, globes, and the like, clean. The windows must be washed every week, and every long vacation the walls should be lime-washed. Special care must be given to the out-houses. The children must be made to keep their hands and faces clean, and should be taught to use brushes. For a child to bring back on his shoes the dirt of the previous day is unpardonable. To these demands it should be added that cracks in

the floor must be carefully filled, and it is well to dispense with the usual sharp corners.

The most effective means for ensuring cleanliness of the pupils seems to be the introduction of school-baths. Baths have been introduced in a number of European schools. In Germany, Göttingen was the first city to try the experiment, about ten years ago ([22—p. 149]). Magdeburg, Nuremberg, Weimar, Munich, and other places have followed her example.

Douche, or shower-baths, are usually adopted on account of their cheapness. The baths in *Bürgerschule* No. II, in Weimar ([48—II, p. 325]), will serve as a sample. There are two rooms, one for boys and one for girls, and dressing-rooms for each. A system of shower-baths is employed. Shallow zinc bowls, each large enough for three pupils, are used. Water from the city water-works is provided, and the entire cost of furnishing these baths was only about four hundred dollars. The bathing occurs during the school hours; and after bathing the pupils remain for a time in the classroom and cool off.

Dr. Mähly ([48—II—p. 659]), School Physician in Basel, describes the manner of using the school-baths in Germany. The pupils bathe by classes, the bathing is carefully supervised, pupils come in divisions like soldiers and follow each other every five minutes, and thus a large number of pupils bathe in a very short time. The instruction is somewhat disturbed of course; but the disturbance is not great, and this is more than counter-balanced by the advantages of regular bathing.

The reports from those schools where baths have been introduced are uniformly favorable. The bathing is usually voluntary, but it is generally approved by the parents. Some of the children have a sort of hydrophobia at first, but generally after a little time enjoy the bath. In Göttingen, after a half year, ninety per cent. of the pupils voluntarily shared in the school-baths. The children return to their study refreshed in mind and body. There is an improvement in the air of the schoolroom. It is maintained that the bath has an educating effect upon the children in giving them a sense of cleanliness. Much stress is placed also upon the educating influence that the introduction of school-baths has upon the parents in making them care for the children's underclothing and the like. In many cases great improvement in the health of children has resulted from the habit of regular bathing.

The slight cost of these baths in Germany is noticeable. In no instance have I seen an estimate of the first cost that exceeded one thousand dollars; and they are maintained at slight expense. In Karlsruhe it was estimated that one douche-bath cost one *Pfennig*.

The question of school-baths involves, of course, the great question of the duty of the state to the individual. Eulenberg and Bach([22–p. 491]) think hygiene should have some care to avoid school-socialism. When the question came up in the Berlin Assembly of Deputies in 1886, warnings were heard from several sides against establishing an omnipotence of the school, and the motion for baths was lost, although supported by distinguished men. Apart from this opposition on principle, there were two parties, one of which favored school-baths, the other, public baths. In Berlin the latter party prevailed. F. A. Schmidt of Bonn proposed a compromise. He recommended the establishment of as many public baths as possible, which might be used at definite hours by the school children. It is interesting to note that on the 31st of July, 1889, the *Cultus-Minister*, Von Gossler, ordered that in summer every pupil in the higher schools must take at least one cold bath weekly([22–p. 492]); at other seasons, and in case of deficient opportunity, one every fourteen days was required. He recommended a large swimming basin and tub-baths. Where these could not be afforded, douche-baths would do.

X.—School Furniture.

Twenty-five years ago, in connection with his tests of eyesight, Dr. Cohn measured the height of ten thousand children in Breslau, and measured their desks. He stated that he found these old desks "opposed to every reasonable hygienic requirement." They "were set up quite arbitrarily and without any reference to the height of the children in the classes. Pupils three feet six inches and others five feet two inches in height sat at the same desk ([37–p. 99]). The same was probably true of most other schools at that time. Most of the school-seats and desks in this country were as bad or worse. In none of the schools was there a proper adjustment of the seats and desks to the height of the pupils. There were still in some localities old schoolhouses in which a row of desks ran along three sides of the room against the wall, and the pupils sat on a board with their backs to the teacher, while inside this row of desks were one or two tiers of seats for the younger pupils.

Barnard's classic book ([23]) on school architecture, however, had already begun to work a reform in this country; and in Germany the physiological studies of Prof. Hermann Meyer ([47]) and others, had explained the principles that most determine the course of the reform.

The mechanics of sitting as shown by Meyer ([47 and 21–p. 101]) is briefly as follows: The two seat-bones are curved like a bow;

a line joining the lowest points of these two bones is called the seat-bones line; the center of gravity of the body is in front of the ninth or tenth chest vertebra; and a straight line from this point to the ground is the line of gravity. Upright sitting is possible only when this line passes through the seat-bones line. This line determines the surface of support for the body. But the least movement that displaces the center of gravity makes upright sitting impossible without great muscular effort. The surface of support is then determined by some third point. In a forward sitting-posture the line of gravity falls in front of the seat-bones line, and the third point that determines the surface of support is given by the edge of the form, or when the seat is not broad, by the point where the feet come in contact with the floor, or by both points together. The line of gravity may now fall on that surface which is determined by the front edge of the seat and by the seat-bones. The nearer it approaches the former, the greater the muscular effort required to keep the body in equilibrium. Hence the nearer to the knee the seat extends, the larger the surface of support and the easier it is to retain the equilibrium. All the demands for an upright sitting posture would now be satisfied if the trunk were immovably fixed in the hip-joint, but it is joined movably to the thighs; hence the upright posture can be maintained only by the work of the pelvis muscles. The muscles soon become fatigued and the body would fall forward unless supported by leaning the chest and arms against the table.

In the backward sitting-posture, in which the line of gravity falls back of the seat-bones line, the end of the coccyx is the third point which determines the surface of support. This position has the great advantage of having this third point fixed and immovable. The body with this backward inclination should be supported by a back-rest. This may be placed against the shoulders, but then the position is a half-reclining one. The lower down it is placed within certain limits the more it helps in an upright posture. Placed at the upper edge of the hip-bone, or back of the last vertebra, it holds the pelvis and the trunk in an upright posture. The principle then is as follows: A pupil must always take those positions in sitting in which the line of gravity falls a little back of the seat-bones line. The upper part of the body also must be supported. It is easy to determine the kind of seat that should be used in accordance with this principle.

The fundamental rule for the choice of school-desks as formulated by Uffelmann ([45—p. 758]) is that the school-seat and desk in all parts must be adjusted to the corresponding measurements of the child's body when clothed. Measurements

have been made by Zwez, Fahrner, Cohn, Geissler and Uhlitzsch ([49]), and others, to determine the height of children at different ages, and the relative length of different parts of the body, with the special purpose of finding the proper dimensions for school-desks and seats. The estimated height for different ages according to the Saxon Ministry, the Württemberg Ministry, the manufacturer Lickroth, and the results found by Geissler and Uhlitzsch, are given by Hankel in ([46–IV, p. 840]) the following table:

Age.	By the Saxon Ministry.	By the Württemberg Ministry.	By Lickroth.	Found in the Freiberg School Inspection Dist.
Yrs.	cm.	cm.	cm.	cm.
6-8	112-121	114.6	100-115	107.5-115.1
8-10	122-131	127.4	116-130	115.7-124.1
10-12	132-141	140.4	131-140	124.3-133.1
12-14	142-151	151.8	141-156	132.8-142.8

1. Height of Seat.—From these measurements it is found that the length of the lower leg from the sole of the foot to the knee, from the ages of six to eighteen, amounts to from twenty-nine to fifty cm., or almost exactly two-sevenths of the length of the body. Hence most writers agree that the height of the seat should be about two-sevenths that of the body.

Hankel's table is:

Age.	Length of the leg from the sole to the knee.	Height of the seat	
		according to regulation in Saxony.	according to Lickroth.
Yrs.	cm.	cm.	cm.
6-8	30.7	33	31
8-10	34.9	36	34
10-12	38.5	39	38
12-14	40.3	42	42

Width of Seat.—The seat must be wide enough to furnish the upper leg a sufficient support, but not too wide to allow support by the back-rest during writing. Hence the width of the seat should be only about one-fifth the length of the body, or three-fourths the length of the upper leg.

Hankel's table is:

Age.	Length of upper leg.	Width of the seat			
		according to regulations in Saxony.	according to regulations in Württemberg.	according to Lickroth.	according to Kunze.
Yrs.	cm.	cm.	cm.	cm.	cm.
6-8	35.3	23.0	22.9	23	23.5
8-10	39.6	25.0	25.5	25	24.5
10-12	43.1	27.0	28.0	28	26.5
12-14	44.9	29.0	30.3	30	27.5

The figures given by different writers vary. Some say that the width of the seat should equal the length of the upper leg measured from the knee to the back. The width recommended by Eulenberg and Bach ([22—p. 188]) and others, namely, three-fourths the length of the upper leg, or one-fifth the length of the body, is better. The seat should slope downward a little toward the back; and where two pupils sit together a length of at least 64 cm. for each pupil should be allowed.

Back-rest.—No one can sit erect very long without a support for the back. Hence a back-rest is very important. It should support the back under the shoulders and also just above the hip-bones. To meet these demands, according to the regulations in Saxony, the height of the shoulder-rest and cross back-rest should be as shown in the following table ([43—IV, p. 345]):

Age.	Height of	
	shoulder-rest.	cross-rest.
Yrs.	cm.	cm.
6-8	30.0	17.0
8-10	32.0	18.0
10-12	33.0	19.0
12-14	35.0	21.0

The Difference.—The *difference*, or distance from the seat to the edge of the desk, should be such that the child when sitting erect can easily place both fore-arms on the desk without lowering or raising the shoulders. From the ages of six to eighteen, the distance of the seat-bone to the elbow, when the arms hang down, is from 13 to 23.5 cm., or a little less than one-seventh the length of the body. Hence the difference, according to Uffelmann ([45—p. 759]), should be equal to the distance from the seat-bone to the elbow plus 1.5 cm. There is some diversity of opinion. According to the Württemberg regulations and some other authorities,

the difference should be one sixth the height of the body, with 1 to 2 cm. more for girls on account of their thicker clothing ([48–IV, p. 245]).

Hankel's table is:

Age.	Distance of the elbow from the seat-bones.	The Difference according to regulations in Saxony.	according to regulations in Württemberg.	according to Lickroth.	according to Kunze.
Yrs.	cm.	cm.	cm.	cm.	cm.
6 8	16.4	17.5	20.0	21	19.0
8-10	17.5	20.0	22 0	23	20.8
10-12	17.9	22.5	23.5	25	24.7
12-14	20.0	25.0	25.5	27	26.8

It is of the utmost importance to have the correct difference, since upon this, together with the proper distance, chiefly depends a correct sitting posture.

The Distance.—The distance of the seat from the desk may be zero, a positive distance, or a negative distance. All authorities condemn the plus distance. The only merit of such a seat is that pupils can easily get out of it. The zero distance is better, but the body cannot easily be held in proper position while writing. The proper conditions for writing can be obtained only by a minus distance. The edge of the desk should overlap the seat by about two inches. The chief objection to this is the difficulty in rising and sitting down. This difficulty is removed by using one of the various kinds of sliding seat or movable chair, or by having the desk-top movable. It is of prime importance during most of the school-work, especially in reading and writing, to have the seat at a minus distance. This is shown by Meyer's ([47]) investigation of the physical conditions of sitting. Most of the old seats were placed at a fixed plus distance, and pupils during writing were obliged to lean forward or else to slide forward to the edge of their seats.

Desk-slope.—When a book lies flat before us and we sit upright, it is difficult to read, since the eyes must be turned very far downward. Placing the book at an angle of forty-five degrees, reading is very easy. The latter slope, however, is too great for a desk, since everything will slide off. Most authorities advocate a slope of one-sixth, but the latest Lickroth desk with an inclined seat, has a slope of one-fourth. A foot-board should be used when necessary and the other dimensions of seat and desk may be determined by circumstances.

Other tables giving height of children at different ages, and proper dimensions of seat and desk, are given by Cohn,

([21—p. 120]), Baginsky([27—p. 283]), Spiess([45—p. 761]), and others([55—p. 10]). It will mark a great advance in school-reform when all schools are furnished with seats and desks made according to these measurements. But the ideal is to have the seat adapted to the individual child rather than the average child. As Eulenberg and Bach say, "nowhere is individualization more necessary than in making school-seats." The seat and desk should fit the child like his clothes. To ensure this the individual pupils must be measured and individual records kept. When some one of the existing adjustable seats and desks is improved and simplified, such adaptation to the individual will be possible in every school. The pedagogical objection to having desks of different heights in the same tier can be reduced to a minimum by having the floor slope upward toward the rear of the room.

That the determination of average height for given ages is not sufficient, is seen by noting the differences in the above tables and the great range of variation found by Geissler and Uhlitzsch. They measured in the Freiberg district 21,173 children between the ages of six and one-half and fourteen and one-half years. There were very great individual variations. For example, the tallest boy over fourteen measured 176 cm., the shortest of the same age, 97 cm.; the tallest girl 167 cm., the shortest of the same age, 109 cm. These, of course, were very exceptional, but they found further that the children of this district were shorter than those of the rest of Saxony; and that children of wealthy parents were taller than those of the poor. Doctors Boas and West in their measurements of 3000 Worcester children have found such differences between the sexes that it is doubtful if the same seats should be used for both. If the seats and desks are not adapted to the individual, then school measurements should be made in every city. It is very probable that seats made according to the tables cited above would not fit American children.

The conditions for an upright sitting posture and the determination of the proper kind of school-desk and seat form a problem by no means simple. Not only must seat and desk be of proper height, but the seat must be so adjusted that the body may be held in equilibrium with the minimum muscular effort so that a pupil writing would retain his position if the desk were suddenly snatched away. Then the spine is in normal position, the breathing is unhindered, there is no abnormal pressure on the abdomen, and with suitable desk, the eyes are at proper distance from the paper. Regard to the principles that have been stated will ensure this. Upon the main points there is substantial agreement of all authorities. The following rules given by Dr. Esmarch ([21—p. 104]) will serve

as a good résumé of the main principles for immovable seats.

1. "The form-seat must be as far above the foot-board as the child's leg is long, measured from the bend of the knee to the sole. 2. The form-seat must be as wide as the thigh is long, measured from the knee to the back—[most authorities say less.] 3. The rounded fore-edge of the form-seat must be from four-fifths to one and one-fifth inches (2 to 3 cm.) further forward than the desk's inner edge. 4. The seat must be high enough for the child to be able easily to place his fore-arms on the desk in writing *without* raising his shoulders or bending down his head and back. 5. The lower part of the back must be sufficiently supported in reading (cross back-rest). As these proportions vary with the growth of the children, the seats ought to be readjusted by taking fresh measurements at least every half-year."

The rules in regard to seats and desks given by boards of health and school officials in this country are usually too general and indefinite. "The desks should be neither too high nor too low," "the seat should be comfortable and not too far from the desk," are samples. A praiseworthy exception are the rules given by Dr. Lincoln ([35]), and he rightly says that no seat can be devised suitable for long continued occupancy by healthy children. Growth is impaired and deformity caused by mere lack of bodily activity. Development of the whole muscular system is necessary, so that in sitting due support shall be given by nature.

Henry Barnard in this country, and Fahrner, Meyer, Cohn, and others in Germany, were the originators of the movement for school-desk reform. Since Meyer's study and Cohn's measurements a whole industry of school-desk manufacture has sprung up, and many different kinds of seats and desks conforming more or less to hygienic requirements have been invented. Descriptions of different styles that illustrate the general principles are given by Cohn ([21]), Hinträger([26]), and others. (See Ped. Sem. I, 3, p. 431). Adjustable seats and desks have been invented by Brandt ([51]), Lickroth, Marble, and others. Brandt suggests a devise for averting what he calls the schoolmaster's sacred horror of adjustable seats and definite seat-numbers. He suggests that the class can march before a scale, which need not be graded in centimeters, but may have the seat-numbers placed on it. The number opposite the top of the pupil's head will indicate his proper seat. This can be written in the class-journal. The whole process will require only a few minutes. The rest can be left to the school janitor, who adjusts the seats to the individual pupils. Since the measuring of the pupils and the adjustment of the seats need be made but twice a year, the

task is not serious. Such a plan, however, is defective, since the mere height is not enough to indicate the kind of seat.

In any movement for desk reform, those who advocate the old desks have a factitious advantage since they work in the interest of the tax-payers. To secure the results desired without the expense of putting in new seats and desks, a number of devices have been invented ([21—p. 123]). The first of these were Schreiber's Straight-Holder, an instrument of torture that was screwed on to the desk and pressed against a child's collar-bone when he did not sit erect, and Happel's Wooden Disk that pressed the child's chest when he stooped forward. Other supports are Heffter and Schuppli's Writing Crutch—a cross-bar placed across the throat, Soennecken's Chin-Holder—a wooden rod with plate for the chin fastened in a slanting position to the table by a steel spring, and Kallmann's Face-Rest. "Thus," as Dr. Cohn says, "supports have gradually climbed from the chest to the collar-bones, the throat, the chin, and lastly the face." Most of these are to be condemned as instruments of torture or as illusory remedies for improper seats. But Kallmann's face-rest has been strongly recommended by the Royal Provincial Medical College at Breslau, and Dr. Cohn says that he never allows his own children to write without it, even at the best possible desk.

Recently statutes have been passed in several countries in regard to school-seats and desks. Switzerland forbids the plus distance. The government of Prussia has given much attention to the subject. A decree issued in Breslau ([21—p. 121]) in 1881, directed the attention of school officials to the importance of minus distance in writing, recommended the improved desks made by Lickroth and others, and resolved: that in every General Conference of Teachers held during the next year, the school-desk in relation to health, teaching, and school discipline, should be thoroughly discussed; and further enacted, that in every case of the opening of a new school or the refurnishing of an existing school, a report should be made stating the kind of school-desk proposed. By the decree of the 11th of April, 1888, issued by the *Cultus-Minister*, von Gossler ([22—p. 208]), it was recommended that in every class there should be seats of two or three different sizes corresponding to the size of the pupils. In the People's Schools where a half dozen pupils sit on one seat, an arrangement for changing the distance between seat and desk was required. The same for the *Vorschulen* and the lower two classes of the higher schools. For the other classes of the higher schools there must be movable seats where more than two pupils sit together. If only two sit together, a fixed zero, or better a

minus distance is prescribed. Folding desks and the like for changing the distance are not recommended.

In this country since the kind of school furniture adopted depends upon the local authorities, there is considerable variety in the character of the seats and desks. In the rural schoolhouses, there is little adaptation to hygienic norms. Even in the best city schools, the seats and desks are seldom what they should be. In some respects we have better seats than those in common use in Germany, but comparatively few of the city schools conform to hygienic requirements in this respect, and in some of the rural schoolhouses the seating arrangement is nearly as bad as in Spain, where old seats and desks are commonly used ([50]), and a plus distance of from three to four inches is prescribed by law.*

The history of the movement for school-desk reform forces one to admit that there is some truth in Tolstoy's charge that schools are managed in the interest of the teachers not the pupils. Although thousands of school-children have been measured, and the physiological conditions of correct sitting have been shown by Meyer, Fahrner, Cohn, and many other scientific men, school officials have remained ignorant of such study, or indifferent to it. School-seats and desks have been furnished as we send clothes to the missionaries; even the specially conscientious officials have been satisfied if the seats were made of good material and consisted of a variety of sizes; and school boards and carpenters have upheld the old traditions and laughed at reformers who have maintained that diseases of digestion, circulation, of the spine, and sex organs, were caused by unhygienic seats.

Dr. Cohn([37]—p. 104) found that even in his own city it was not easy to have hygienic principles observed. Twenty-five years ago an effort was made to furnish the Breslau schoolhouses with proper seats. All physicians were then agreed upon the necessity of the minus distance. Dr. Cohn and two other physicians were consulted. But the majority of the deputation were teachers. They declared that the few inches distance in writing made no difference, and argued that the pupils would be hindered in rising up quickly if the modern benches were used. Hence the physicians were outvoted; and the old seats with fixed plus distance were again adopted for the new Breslau schoolhouses. Not till fourteen years afterward, when the government had prescribed the minus distance, did the city decide to have the new benches for the new schoolhouses. "Meanwhile," says Dr. Cohn, "thousands and thousands of children had sat on the wrong

* See the Report of the Commissioner of Education for 1888–89, p. 243.

benches, and even to-day, with few exceptions, they sit improperly. For in the same class they are mixed up at unsuitable desks, instead of being given different sizes according to their height. Scarcely 3,000 of the 50,000 school children in this city to-day are seated according to their height." One cannot suppose that these Breslau teachers were sinners above all other Germans in this respect. Probably similar obstacles were encountered in other cities. In our own country, fifty years ago, when many of our schoolhouses had the desks arranged about three sides of the room, so that the pupils sat with their backs to the teacher, the advantage claimed for this arrangement was that it afforded the teacher a better opportunity to detect mischief([25]–p. 42). The objection to movable seats is that children make noise with them. The objection to seats at a minus distance is that pupils cannot easily get up and down. And in some schools, to make discipline easier, the highest seats are awarded to pupils of the highest rank irrespective of their size.

The other articles of school furniture that especially claim attention are blackboards, slates, and maps. In regard to the last, the important point is to have all the names, stars, and the like of sufficient size to be easily recognized. The type used on many maps is so small that it is very trying to the eyes.

With the ordinary slate there is so little contrast between the gray strokes and the dark gray background that writing is somewhat trying to the eyes. Prof. Horner([21]–p. 184) made comparative measurements of acuity of vision as tested with letters written by slate-pencil, lead-pencil, and pen. He found with the letters *B* and *E* that black on white was recognized best; and, doing away with the shining reflections of the slate, he found these letters written with ink recognized on a clear day up to a distance of 211 cm.; with lead pencil to 183 cm.; with slate pencil to 159 cm. According to these tests, an eye that can read ink letters at a distance of 12 inches must be only 9 inches distant in order to read letters of the same size written with a slate-pencil. Hence Horner inferred that the hygiene of the eye demanded the banishment of slates and blackboards from the schools, and the use of pen and ink. In Switzerland, some teachers who tried this plan found great educational advantages in it. The clatter of the slates was avoided. The children sat up better, since they could read more easily what was written. The difficulties incident to a change from pencil and slate to pen and ink were avoided by using the latter from the first. And there was the great moral advantage of more order resulting from the inability to rub

out mistakes. The experiment was tried in Zürich([21 – p. 186]) between May, 1877, and Feb., 1879; but the plan was not approved by the congress of teachers. It was, however, decreed by the school officials of Zürich that pen and ink should be chiefly used.

Dr. Cohn recommends Thieben's tablets, which are made of white artificial stone, and can be written on with a special pencil. The writing can be erased with a sponge, and the tablet is free from shining reflection. Weber recommends cardboard tablets written on with charcoal pencils. Instead of a blackboard Dr. Cohn uses in his own lecture room a tablet of dull glass, on which he draws with white and colored chalk; and he says that Prof. Köster of Bonn uses a dull white painter's canvas, on which he draws with soft charcoal. The charcoal can be rubbed off with a dry rag. Little fault can be found with the best slate blackboards used in American schools.

XI.—READING.

We have next to consider the different school activities. Reading, and writing demand special consideration from the point of view of hygiene. Javal seems to have been the first to study scientifically the hygienic conditions of reading. His *Essai sur la physiologie de la lecture* appeared in 1878 and '79. Since that time considerable study has been given to the subject by Dr. Weber and others. The main points to be considered are the following:

1. Size of the Letters. It is necessary that type be easily legible at a distance of twenty inches. For this it is necessary, according to Dr. Cohn's([21 – p. 198]) estimate, that the letters be 1.5 mm. high. "Any type that is smaller than 1.5 mm. is injurious to the eyes." An angle of 5 minutes is sufficient for the recognition of a letter; hence, according to the estimate of Dr. Weber, a healthy eye can read clearly a letter .7 mm. in height without extreme convergence; but such reading is very laborious. Weber tested the time occupied in reading with different types. When the size of the letters was greater than 2 mm., he found that the speed of reading was retarded. He decided for a minimum of 1.5 mm. Eulenberg and Bach ([23 – p. 224]) demand still larger type for the lower classes. Many of the school-books in common use have much smaller letters than Weber's minimum. In some of the school atlases, letters only .5 mm. in height are used. Many very beautiful maps also have very small type. Especially before pupils have become familiar with the letters, it is necessary to have large type. Javal wishes to have it determined by experiment how large the type should be in the different classes in order that

no pupil, however bad the light, need bring his eyes too near the book.

2. *The Thickness of the Letters.* "No print of which the down stroke is thinner than 0.25 mm. should be tolerated in school-books"([21 – p. 201]). In Latin type the corners of the letters should be strengthened in order to make them appear rectangular, otherwise by the irradiation of the white ground they appear rounded off.

3. *The Shape of the Letters.* Javal points out that, if the lower half of a series of words be hidden from view, it still is easy to read them. But when the upper half is covered, it is difficult, often impossible, to do so. In reading, we glance along the line at a little distance above the centre of the letters; and the letters g, j, p, q and y are the only ones that come below the line. Thus the upper part of the letters are of special importance. As the result of an extended research, Dr. Sanford([53]) found several groups of letters in our alphabet that are relatively poor. Of the small letters c, e, o are confusable with one another; a, n, and u are poor letters; and s, i, l, t are liable to cause confusion. Javal, Cattell, and Sanford have each suggested changes for improving the form of some of the worst letters. Among the most important of these are Javal's suggestion that letters be made broader, and that we return to the more open forms of c, e, and o, and Sanford's suggestion that a letter in the shape of an inverted v or of a small cap A might be substituted for our present small a.

4. *The Approach.* The distance between letters and words, or the *approach*, is important. Every letter stands out with especial distinctness when the space between two letters is wider than the space between the ground strokes of the letter. For this reason words are emphasized in German by spacing the type. This greater approach adds to legibility. School-books should have an approach of nearly 1 mm.

5. "*Leading*" is important. "A book has good interlineage," according to Dr. Cohn, "when, if the letters are 1.5 mm. high, the lines are 3 mm. apart." A distance of 2.5 mm. ($\frac{1}{10}$ of an inch) is the smallest admissible. Many of the old books had wider interlineage than is usual at present.

6. *The Length of the Lines.* The shorter the line the more easily can one read. Javal thinks the long lines the cause of progressive myopia in Germany. According to Dr. Cohn, the greatest length of line should be only 10 cm. Weber would have lines from 14 fo 15 cm. in length.

Dr. Cohn résumés his rules as follows: "In the future I would have all school authorities, with measuring rule in hand, place upon the *Index librorum prohibitorum* all school-

books which do not conform to the following measurements: The height of the smallest "n" must be at least 1.5 mm. [.06 inches], the least width between the lines must be 2.5 mm. [.1 inches], the least thickness of the "n" must be .25 mm. [.01 inches], the shortest distance between the letters .75 mm. [.03 inches], the greatest length of text-line 100 mm. [4 inches], and the number of letters on a line must not exceed 60([21 – p. 206]).''

The type must be black, the paper untransparent and white, or, according to Javal, yellowish in color. Weber, however, favors pale gray. The Hygienic Congress at Turin in 1880, passed a resolution favoring yellow paper for all school-books. Although text-books in this country are usually well-printed, too small type is sometimes used. In Germany, Blasius and Schubert([21 – p. 207]) found many books that did not conform to hygienic requirements. Especially injurious are the dictionaries and atlases commonly used, and many maps and charts.

XII.—Writing.

Statistics in regard to diseases of the eye and spine show that the majority of cases of scoliosis originate during the period of school-life, and that the per cent. of near-sighted pupils increases alarmingly from the lower to the higher grades. For example, of 1,000 cases of scoliosis, Eulenburg ([27—p. 514]) found over 90% in the period of school-life. In 24 *Gymnasien* and *Realschulen*, containing nearly 10,000 pupils, Dr. Cohn([21—p. 72]) found 22% of myopic students in *Sexta* and 58% in *Prima*. Such statistics, in connection with the well-known collapsed position common among pupils while writing, caused a strong suspicion that one of the chief causes of these diseases might be due to the method of writing with slanting script and book placed at the right.

The importance of the kind of script, from a hygienic standpoint, and of the position in writing, was shown in 1877 by Ellinger([21—p. 172]), who opposed the usual custom of placing the copy-book at the right. Laborious investigations followed, to determine the physiological laws of those movements of the hand and eyes involved in writing. Ellinger had maintained that, in writing, the base-line, *i. e.*, the projection on the copy-book of the line joining the middle points of the two eyes, is parallel to the lines of the book, the head being tipped to the left when the copy-book is placed obliquely. Weber, however, maintained that the work of the eye in writing is an act of taking aim. According to his observations, "children, when writing *carefully*, do not turn the head to the left, but turn the forehead down to the right and look upward at

an angle of about 30°, just as if taking aim with a gun in the direction of the pen-stroke"([21]—p. 171).

Berlin and Rembold([21]—p. 177), appointed by the Württemberg Ministry to investigate the influence upon the eye and attitude of the usual oblique-right position of the copy-book, made careful measurements in the case of several hundred children. They found, with the slanting script, that the base-line projected upon the copy-book would always cut the written lines at the pen's point at a considerable angle, generally falling below the written line at the right and above at the left. In no case was the base-line strictly parallel to the written lines. They found further, that with few exceptions the down-stroke of the pen formed a right-angle with the projected base-line. Upon the basis of this investigation they proposed a series of rules for writing, which were adopted by the Württemberg Commission, and the supposed law concerning the perpendicular relation between the down-strokes and the base-line has played a great role in discussions concerning the position of the copy-book. Further investigations by Schubert([48—II., p. 70]) and others, however, have cast discredit upon this supposed law. Daiber([57]), who has very thoroughly criticised the Berlin-Rembold report, thinks that the children tested by these authors sat with unnatural uniformity during the short time occupied by the test; and he maintains that the relation found between base-line and down-stroke is due to the position of the joints involved in writing, as well as to the inclination of the head. He points out also, that, with closed eyes, the down strokes are perpendicular to the base-line whenever the pen-point falls in the sagittal plane of the head. Daiber([57—p. 16]) is certainly right in emphasizing the necessity of considering all the mechanical causes of bad position in writing, the laws of the hand, arm, etc., as well as of the eye.

Two kinds of script are to be considered—the vertical script and the usual script slanting toward the right. Four positions of the copy-book are possible: 1st, straight at the right; 2d, obliquely at the right; 3d, straight-central; 4th, oblique-central. The kind of script stands in intimate relation to the position of the copy-book. Schubert([48—II., p. 62]) has shown that with the straight-central position a pupil is likely to write the vertical script; with the other positions, the slanting script. Let a line drawn from the point of the pen to the middle of the breast be called the "line of direction" of the fundamental strokes. By careful measurements of the angle that this "line of direction" made with the down-strokes in 1,586 tests in the case of 316 children of the 3d, 4th, and 5th school years, Schubert found that, with all four

positions, the two lines approximately coincided. Moreover, he measured 275 lines, and in only 11 cases did he find the first and last down-strokes parallel. In 251 cases the last down-strokes converged downward toward the left from the parallel.

Both positions at the right are bad. All authorities in hygiene are agreed upon this point. With the book placed a few inches to the right of the median plane, the head must be turned to the right; the shoulders follow more or less; the left shoulder is raised, the right sinks; the spine is crooked toward the left. This position is fatiguing, and the body soon collapses; the eyes are brought dangerously near the paper, and the body is supported on the left arm in the position so familiar to every teacher. This position, with copy-book at the right, is especially bad for the eyes and spine. Mayer ([48—II., p. 65]) showed that the wrong position that he had most frequently found among children writing with book at the right, accurately corresponded to the permanent curvatures of the spine that he found most frequent in the same classes. Schenk([48—II., p. 66]) has corroborated Mayer's results by measurements of 200 children. In case of each child, he measured its spine in the usual position when writing and when at rest, and he found 160 of them had more or less of a permanent curvature toward the left. The position at the right is also injurious to the eyes. Every variation from an upright posture brings the eye nearer to the book, forces one to a stronger convergence of the sight-lines and requires greater accommodation, and thus near-sightedness is indisputably favored. Moreover, the right eye is worked harder than the left, and thus, as Schubert thinks, a greater degree of refraction is caused in it. Considerable plausibility is lent to this view by the fact of the more frequent and greater degree of myopia in the right eye. Schubert([48—II., p. 67]) has compiled the results of 21,949 investigations by Berlin-Rembold, Schmidt-Rimpler, Kotelmann, *et al.*, and found that 24% of those tested showed unequal refraction of the two eyes, and that in 61.6% of these cases the right eye was more myopic than the left.

It would be unnecessary to dwell upon these evils connected with the two positions at the right were these not common positions in the schools in this country and advocated by many high authorities. Spencer, in his Key to Practical Penmanship, speaks of both positions of the book at the right as proper (p. 24, seq.); and in De Graff's "School Room Guide," a book used in all parts of this country and now in its 70th edition, the following instructions are given: "In teaching position to school children, let them turn the right side, placing the right arm on the desk parallel to its front

edge; left hand brought to the edge of the desk to hold book or practice-paper, both feet on floor, etc., straighten the arm until the elbow comes near the front of the body" (p. 72). The evil of such a position has been repeatedly shown since the investigations of Berlin and Rembold, and the continued practice of teaching it to pupils is inexcusable.

While all specialists in hygiene condemn the positions at the right, there is a conflict of opinion in regard to the two positions in front. Berlin and Rembold and the Württemberg Commission([21—p. 178]), Schmarje([48—II., p. 375]), Lukas([55]), and others advocate the oblique-central position of the copy-book slanting upward from left to right at an angle of 30 to 40°. The down-strokes then should be made at right angles to the edge of the desk. Schubert([56]), Cohn([21—p. 174]), Daiber([57]), Kotelmann([53—p. 32]), and others advocate the straight-central position of the copy-book, and vertical script. The arguments for the latter are as follows:

With straight-central position and vertical script the upright sitting posture is the natural one. Not only the body, but also the head and eyes are likely to be kept in proper position. In 400 tests with the straight-central position Schubert([48—II., p. 69]) found an inclination of the head toward the left of 2.8°, while in 543 tests with oblique-central position the inclination to the left amounted to 7.9°. Berlin and Rembold found no great difference in the position of the head with these two positions, but investigations by Mayer corroborate the results found by Schubert. This inclination of the head to the left, it is maintained, is in agreement with a corollary of the Wundt-Lamansky Law that the eyes prefer to follow lines in the visual plane or perpendicular to it. The eyes must follow the oblique lines of the copy-book, as well as the strokes of the pen; hence, according to the law mentioned, there is a tendency to bring the base-line parallel to the lines of the copy-book, and the head is inclined to the left. What happens here in slight degree is seen in an extreme way in trying to read with a book placed obliquely.

Dr. Hertel([48—IV., p. 672]) of Copenhagen lays stress upon the position of the arms in writing. Only when we are lying down are all the muscles at rest. When standing and sitting a certain strain of the muscles of the trunk is necessary, especially of the long muscles of the back and of the *musculi-rhomboidei*. When we let our arms hang down freely by our sides, a less effort of these muscles is necessary to preserve an upright posture. Hence, in all well-conducted athletic exercises, especially in the Swedish system, the aim is to develop and strengthen these muscles. When a child, in writing, holds his arms near his side, he can sit erect without the least

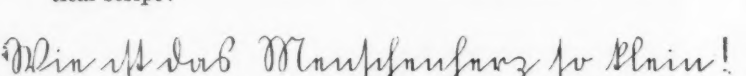
difficulty. As soon, however, as one or both arms are placed so far forward that most of the forearm rests on the desk, the *musculi rhomboidei* go to sleep and the tension of the long muscles of the back ceases. As a result the child soon begins to collapse and bend forward, since the dormant muscles no longer counteract the weight of the head, which is inclined forward. Hence, when one uses the straight script, by which the arms are kept near the body, one is more likely to sit erect than with the slanting script, which requires the greater part of the forearm on the desk. "An active tension of the muscles of the back is necessary," Hertel insists, "in order to preserve a straight upright posture."

Further, it is maintained that children naturally write with the straight script, and sit erect while writing thus. "Ten years ago, in a village school, says Dr. Cohn([37]), I found that all children sat bolt upright when I let them write from dictation with vertical script in the straight middle position, but that they fell forward, as by a stroke of magic, if they had to write obliquely again. Every child that learns to write makes straight strokes, and must be forced by a great deal of trouble on the part of the teacher to make oblique strokes." In Dr. Cohn's opinion a pupil who has written a lesson with vertical script must have sat straight while doing it. If he has written obliquely one never knows whether he has sat straight or not.

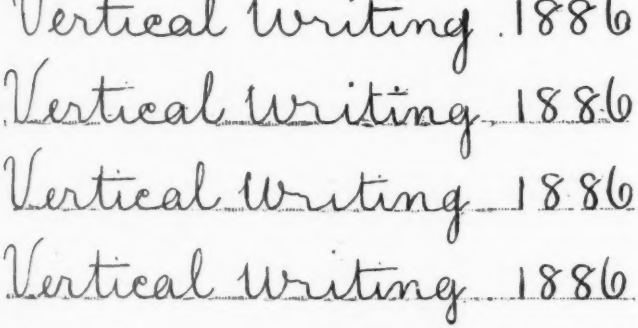
The following are the rules for writing the vertical script given by Schubert([48–IV., p. 38]): 1. The chief aim should be directed to the strictest adherence to the straight-central position of the tablet or copy-book. 2. In order to be able to use the straight-central position it is necessary that the lines be very short. Especially for the first instruction they should not be more than 8 to 10 cm. in length. Slates should be divided vertically into two or three columns, and each written on separately. 3. Copying from books placed at the left should be avoided. 4. Two-thirds of both forearms should rest on the table in symmetrical position, meeting at right angles and forming an angle of 45° with the edge of the desk. The elbows should be at equal distance from the body, namely a hand's breadth. 5. The hand should rest on the outer edge of the nail of the little finger. The index-finger should form a slightly convex bow. 6. The penholder should be long, and grasped not too near the pen. Its upper part should not rest against the index-finger, but on the middle of the hand between the thumb and the index-finger, and should point towards the elbow rather than towards the shoulder or the breast. 7. The arm, as it moves toward the right in writing, should be moved as a whole, so that all the different positions

that it occupies shall be parallel. 8. After each line the paper should be correspondingly raised, so that a proper distance between the point of the pen and the edge of the desk be preserved. This presupposes broad desks. 9. During the whole process of writing, the lines joining the shoulders and the eyes should be horizontal. The upper part of the body must not be bent forward, nor the chest be supported against the edge of the desk; the head should be bent but little, and the distance of the eyes from the paper amount to 30 to 35 cm. 10. It is urgently advisable that the writing be broken by short intervals of gymnastic exercises, such as can be performed sitting.

Scharff's copy-books are strongly recommended by Schubert. The following cut of the copy on page 19, Heft. 5 of *Scharff's Schreibschule*([59]), will serve as a sample of the vertical script:



A sample of vertical script, in English, is the following reproduction of a photographed specimen of headline and writing by pupils in Jackson's ([60]) Vertical Writing Copy Books:



Such script is very legible, and when well written is not lacking in beauty ([48]—IV., p. 27). Scharff ([59]), in his copy-books, has attempted to apply the law of "the golden section." The result is certainly not unpleasant.

On the other hand, the oblique-central position, with slanting script, it is maintained, enables the hand to execute, with ease and precision, the movements involved in writing. It is better adapted to rapid writing than the straight-central position. With it an erect posture is easily obtained, and a minimum strain is put upon the eyes. Schmarje([48—II., p. 875]) has presented the arguments for this position with special force. The habit of placing the copy-book at the right, and the use of pencils, not the slanting script, are, in his opinion, responsible for the evils connected with writing. The hand, not the eye, is the more important organ involved in writing. The most favorable conditions for the hand and arm are obtained by placing the copy-book at an angle of about 30° with the edge of the desk. If the right forearm is placed upon the desk, with the elbow a hand-breadth from the body, the arm moving freely from the elbow then describes at the pen-point an arc whose chord very nearly coincides with the lines of the book when placed at this angle.

Practical experience in the schoolroom must decide between the two positions mentioned. In favor of the oblique position and slanting script is the testimony of Schmarje. He ([49—II., p. 387]) reports that repeated observations upon nearly 700 school children since 1883 have shown that the oblique-central position of the copy-book results in an upright posture. Daiber ([57—p. 49]), however, who teaches in Stuttgart, where the oblique-central position is required, says it has by no means brought a satisfactory solution of the question, and that all that one hears about the matter in teachers' circles is "a great silence." Lukas ([55]) testifies to the advantages of the vertical script for obtaining a proper sitting-posture, but prefers the slanting script on æsthetic grounds. He maintains, further, that with the straight script the right forearm cannot rest on the table, since it must often be moved, and that during rapid writing the right shoulder must be held higher than the left.

The vertical script is now used in some 30 places on the continent ([48—IV., p. 681]). All the testimony thus far seems to be practically unanimous in favor of it. In 1887 the Bavarian Ministry ordered that experiments with the straight script be tried in the schools ([48—IV., p. 24]). These experiments were tried in Fürth, Schwabach, and Nüremberg. Children in one class began with the straight script, and in the same building another parallel class began with the usual script; the vertical script was tried also in Vienna and in Flensburg. According to Schubert's report, the theoretical objections have been removed by experience. The children write as easily as with the slanting script. One teacher had a contest between the pupils who wrote the vertical script and those who wrote the

usual script, and he found that the former wrote as rapidly as the latter. With few exceptions the children sat like soldiers while writing the vertical script. An intimate connection was found between the vertical script and an erect posture. In the control-classes in Fürth, although the children did not sit as well as those using the vertical script, the position was fairly good. The Commission frankly acknowledged this; but it soon appeared that these control-classes were, as one expressed it, "infected with the straight-script baccilus"; their writing showed a much less inclination to the right than the usual script. In Nuremberg, Schubert had the teachers choose, from two girls' classes that had completed the first school-year, ten pupils who wrote the vertical script and ten who wrote the usual script. A test was made with these two divisions. Nothing was said to either class about position. The two divisions were photographed while writing. The photographs show at a glance the difference between the two classes. Those who had been taught the slanting script have placed their slates parallel to the edge of the desk at their right, and, with two exceptions, show the usual collapsed position, leaning on the left side, and with eyes dangerously near the desk. Those, on the other hand, who are writing the vertical script, are sitting admirably.

Prof. Fuchs reports ([43—IV., p. 33]) a visit to Vienna schools where experiments with vertical script were being tried under the instruction of E. Bayrs. Part of the pupils wrote the vertical script, part the slanting, with oblique-central position, the degree of the inclination of the copy-book being marked on the desk by oblique lines. Those who wrote the vertical script sat erect; with the others, admonitions to sit up were of little avail. Especially instructive was a mixed class, where part of the pupils wrote obliquely and part vertically. Looking over the classroom from the rear, one could tell from the position of the children what kind of script they were writing. All those in a bad position were found to be writing obliquely; all of those writing vertically sat in good positions, except one girl who had begun to write the vertical script only two days before.

The vertical-script movement is progressing. At a recent meeting of the Pedagogical Union at Prague, a resolution to try experiments with the straight script in the schools during the school-year 1891–92 was unanimously adopted. The Royal National School Council for Bohemia has made the introduction of the vertical script the object of an inquiry, and likewise unanimously approved the introduction of it as an experiment. A good part of the French writers favor it ([43—p. 97]). They adopt George Sands' motto: *Ecriture droite,*

sur papier droit, le corps droit. In Brussels ([57—p. 48]), a kind of script that is nearly straight is used, and the children are said to sit in good position. In Vienna, the vertical script is now used in about 80 schools([48—V., p. 30]). The Minister of Education has his own daughter taught to use it. In Basel, experiments have been tried in 61 classes. The School-seat Commission has unanimously favored making it obligatory. And it has been introduced into the London Schools.

At the last one or two International Congresses of Hygiene, this question has received considerable attention. At the last meeting at London, Dr. Kotelmann ([48—IV., p. 680]) read a paper advocating the introduction of the vertical script. He showed, by original handwritings and facsimiles, that, in antiquity and in the Middle Ages, straight script was used ([48—II., p. 215]). The slanting script was introduced toward the beginning of the 16th century. He cited the hygienic reasons for the vertical script, and the following resolution was offered by Kotelmann and Jackson ([58—p. 92]): "That as the hygienic advantages of vertical writing have been clearly demonstrated and established, both by medical investigation and practical experiment, and that as by its adoption the injurious postures so productive of spinal curvature and short sight are entirely avoided, it is hereby recommended that upright penmanship be introduced and generally taught in our elementary schools." This resolution was amended by a small majority to read, "for the greater part," instead of "entirely," and was then adopted with only one dissenting vote.

In conclusion, it must be said that the question is still open. The oblique-central position, with slanting script, is more natural for the hand, and probably is the best for rapid writing. The vertical script is more natural for the eye, and the writing is more legible. The results of experiments thus far seem to be strongly in favor of the vertical script in the schoolroom. In the case of children, the objections to it have little weight. The aim in writing, at first, is not rapidity, and with short lines the arm-movement involved in writing vertically, apparently cannot be injurious. The great argument for it is that it conduces to an erect posture. It cannot easily be written except by placing the copy-book in the central position; but the slanting script can be written with the book at the right, and there is always a tendency thus to place it. The vertical script should certainly receive a fair trial in the schools. But the trial should be made with suitable desks and suitable copy-books. Seats at a minus distance must be used, and the copy-books must have short lines. The lines in Jackson's Copy-books ([60]) are twice as long as they should be.

Finally, no good reason can be given for the position of the copy-book at the right, still adopted in many of the schools of this country. Since the beginning of the writing reform no physician has been found to defend it ([48–II., p. 889]), and nothing but the power of what Schiller calls "the eternal yesterday" can make its continuance in the schools possible.

XIII.—The Period of Study.

Two pedagogical principles are radically opposed. One gauges education by the hours, months, and years spent in the schoolroom, by the subjects studied and pages turned, by exercises written and by examinations passed. The other looks less at what a pupil *has* done than at what he *can* do, and deems present intellectual health and mental ability the only evidence of a good education. The representatives of the former principle are always anxious to increase the quantity of education by crowding some new subject into the curriculum, by lengthening the school-day or the school-year, by a rigid economy of the minutes, or in like ways. The representatives of the latter principle aim to keep pupils always at their best, and would shorten the periods of study, if by so doing it be possible to quicken the pace of their students and increase attention. From the standpoint of the former, a loss of time is irreparable; from the standpoint of the latter, work done by the nervous mechanism under abnormal conditions may cause irreparable injury. Of course the latter is the standpoint of school hygiene. Its problem is to determine how long the nervous mechanism can function at its best.

The most serious attempt to solve this question was made recently by Dr. Leo Burgerstein ([66]) of Vienna. Before him, Sikorsky, a Russian, attempted to determine the effects of fatigue upon the ability to perform simple mental operations. His results were based upon 1,500 dictation tests, amounting in all to 40,000 letters. Between the work in the morning and after four or five hours of instruction, he found an average falling off in accuracy of 33%. Burgerstein has attempted to determine the curve of work for an hour, as shown in the performing of simple arithmetical operations.

In the ordinary school work there is frequently a good deal of variety. In arithmetic, for example, dictation, reckoning, recitation, etc., alternate. To offset this, Burgerstein took four periods of exactly ten minutes each, with five minutes pause after each. The pauses were used for collecting and giving out the papers, and with the four periods of ten minutes made fifty-five minutes in all. This plan made the conditions approximate those of the usual school work. He had only

a small number of pupils at his disposal, 162 in all; but he took great care in the details of his experiments.

Burgerstein's method was as follows: The ten digits were written in arbitrary order twice, making a series of twenty figures. Under this was written another similar series. These two series formed the numbers for an exercise in addition. Ten such problems in addition were formed, and these, together with ten simple problems in multiplication, constituted the task for the first ten minutes. An effort was made to derive the problems for the succeeding periods in such a way that both the quantity and the quality of the work should be as nearly equal as possible for each period of ten minutes. Thus the task for the second period was obtained by forming new series of numbers from those already used, taking the 2d, 4th, 6th digits, and so on, then the 1st, 3d, 5th, and so on. The task for the third period was formed by taking the series of the first backward; the fourth task by taking the figures of the second backward. Exercises in multiplication were also given. The first number in each problem for addition was taken as the multiplicand, and the digits 2, 3, 4, 5, 6, as multipliers. The tasks in multiplication for the succeeding periods were derived from the first, as in addition.

The problems were so arranged that exercises in addition and in multiplication alternated, No. 1 being a problem in addition, No. 2 a problem in multiplication, and so on. The figures were printed in large letters, 4 mm. high. The tasks were of such a length that, presumably, even the quickest reckoners would need the entire ten minutes. The pens were taken and laid aside at a word of command.

Many experiments and philosophical reasons make it clear that in continued activity of one kind the work done increases until the store of energy expended in such activity is exhausted or approaches exhaustion. This agrees with the law of practice. This is true of mental activity as well as of muscular. But as the store of energy becomes exhausted, carelessness is to be expected. The results to be described corroborate this view.

Burgerstein tested four classes, containing in all 162 pupils between the ages of 11 and 13; three classes took the test between 8 and 9 o'clock in the morning, the other class between 9 and 10 o'clock. He studied his results most carefully, calculating the whole number of figures obtained by reckoning, and the number obtained by multiplying and by adding separately, the total number of errors, and the total number of corrections, and the number of errors and corrections in multiplying and adding respectively, for each period of ten minutes, and so on.

The number of correct results became less in each successive period; but the number of problems solved increased. The number of children who made no errors in each period was 21 in the 1st period, 7 in the 2d, 6 in the 3rd, 4 in the 4th. The following table([48–IV, p. 608]) gives a summary of the work done:

ALL CLASSES TOGETHER, 162 INDIVIDUALS.

Period.	Total Number of Figures Computed.	Figures in Addition.	Figures in Multiplication.	Total Errors.	Errors in Addition.	Errors in Multiplication.	Corrections.	Corrections in Addition.	Corrections in Multiplication.
I.	28267	14928	13339	851	329	522	370	156	214
II.	32477	16836	15641	1292	466	826	577	239	338
III.	35443	18377	17066	2011	639	1372	743	312	431
IV.	39450	20646	18804	2360	825	1535	968	428	540

As may be seen from the table, the total number of figures reckoned increased from the 1st period to the 2d about 4,000, from 2d to 3d about 3,000, from 3d to 4th about 4,000. Thus the absolute increase in the quantity of work done was least from the 2d to the 3d period. From the 1st to the 2d period the number of errors increased 441; from 2d to 3d, 719; from 3d to 4th, 349; or roughly as before, 450, 700, 350; i. e., from the 2d to the 3d period the decrease in the quality of the work was greatest. The increase in the number of corrections also from the 1st to the 2d period was roughly 200; from the 2d to the 3d, 166; from the 3d to the 4th, 225; i. e., the increase in corrections was least from the 2d to the 3d period. Not too much stress should be placed upon the corrections. It is uncertain how far they are due to fatigue and how far to haste. In some cases they indicate merely that a badly written figure has been corrected. But where, as in most cases, they presuppose a preceding error, they indicate, in Burgerstein's opinion, that the student making the correction has the mathematical operation still in mind, and an immediate perception of the error. This, of course, presupposes considerable mental vigor; and hence a decrease in the number of corrections in a period simultaneously with an increase in the number of errors points at a falling off in the ability for mental work.

The quality of the work done in each period is best seen by

noting the per cent of errors in each. In round numbers it was 3% in the 1st period, 4% in the 2d, 5.7% in the 3d, and 6% in the 4th. These per cents indicate fairly well the curve of error for the hour. The noticeable point is the decided relative improvement in the 4th period. While the increase in error from the 2d to the 3d period is greatest, from the 3d to the 4th it is very small, only about a sixth as great as the increase in error from the 2d to the 3d period. This indicates a decided falling off in the energy available for intense mental work during the third quarter of the hour; and Burgerstein suggests that it seems as if somewhere during the 3d period a relaxing of the mental intensity, a weakening of attention had occurred, and as if the pupils might have unconsciously rested and thus begun the 4th period with renewed energy. In all classes the total increase in errors, and especially of errors in multiplication, is greatest from the 2d to the 3d period; and the increase in the quantity of work done is relatively least. The corrections also corroborate these results. The total number of corrections in all classes show a smaller increase from the 2d to the 3d period than from the 3d to the 4th.

Burgerstein gives also a table([48–IV, p. 615]), showing the total average number of figures, of errors, and of corrections, in each period for each individual, both in multiplication and in addition. In this table where all the classes are taken together, all the rubrics, with one exception, that of the errors in addition, point in the same direction.

In studying his results by classes and by individuals. Burgerstein found, as we should expect, individual differences. Some of the pupils were quickly fatigued, and, instead of doing more work in each succeeding period, did less. 70 of the 162 pupils tested, in one or more periods did less work than they had done in the preceding period. Without going into the details of his figures, the difference between the pupils whose curve of work constantly rises and those whose curve is irregular or constantly falls, is that the latter do less work, often make more errors, and especially in the lower classes show signs of fatigue earlier by a falling off in their work. Apart from one class, the pupils whose ability to work increased showed the least increase from the 2d to the 3d period, but also the greatest increase in errors from the 2d to the 3d period. This result also corroborates the inference that the ability to work was at a minimum in the 3d period.

Burgerstein adds that if further investigations should confirm his results and make them universally valid, the matter of shortening the period of study should be as earnestly considered from the standpoint of mental hygiene as from that

of somatic hygiene. "We can," he says, "force children to sit and to be quiet; but let us not be deceived; they will in many cases rest mentally or divert themselves and not follow the course of instruction when they are fatigued. But this would be a damage in more than one way."

It is not my purpose here to criticise Burgerstein's results, but to call attention to his investigations as a notable beginning of a scientific effort to solve what is perhaps the most important question of mental hygiene. Assuming that there were no serious disturbing conditions, such as very bad air or the like, he is doubtless right in taking the curve of error as indicating the amount of fatigue. But his results, interesting and suggestive as they are, are based upon too small a number of tests to settle the question; and it is always difficult to interpret such results, since the effect of practice and the effect of fatigue are in conflict.

It is greatly to be desired that more tests of this kind should be made. Without some such scientific study of the curve of fatigue for different periods of study the arguments for or against periods of a given length will be merely expressions of individual opinion based upon desultory observation. Far more is involved in this question than the mere matter of health. If education be the training of the nervous mechanism rather than the acquisition of knowledge, then it is certainly very doubtful if mental work should be continued after attention flags and it is impossible to avoid errors; for, according to the law of habit due to the plasticity of the nervous substance, training in error and inaccuracy is the result. The related questions concerning the length of the school day, one session or two, the amount of home study, and the like, must be solved by similar investigations combined with systematic observation. At present no sufficient data exist for a satisfactory solution of them.

The amount of time devoted to recess in this country seems to be too short. In some schools no out-door recess is given. A few years ago this plan had many advocates. The matter was made the subject of a special report at the Council of Education([61]); but fortunately the weight of opinion was adverse to it. At the Berlin School Conference([62]) in 1890 the question of the proper length of the period of study received attention, and the necessity of free play was strongly emphasized.

The resolution proposed at London([58—p. 113]) seems very reasonable. It was as follows: "Until the question of overpressure has been carefully investigated in a proper scientific spirit, school lessons generally should not last longer than three-quarters of an hour." Such a period was prescribed in Hesse-Darmstadt by the decree of May 25, 1883([22—p. 552]), which

ordained that in all the classes of the higher schools a recess of 15 minutes should follow every hour. The Prussian Medical Deputation in their report in the same year recommended the same plan for the *Vorschule* and for the lower classes of the secondary schools. But the decree of 1884([33—I, p. 244]) ordained that in case of a four-hour session in the forenoon and of two hours in the afternoon, or of five hours in the forenoon, the time for recesses should not be less than 40 minutes, nor more than 45 minutes.

XIV.—School Diseases.

The necessity for some change in the present conditions of school life is evident from the great amount of disease among school children. That nearsightedness increases alarmingly from the lower to the higher grades has been shown by the extensive investigations of Cohn([21]) and others([65]). Unhygienic conditions of school work are apparently responsible for many other diseases([27—p. 475]). It has been noticed by a great number of observers that children in a short time after first entering school lose flesh, grow pale, and that their muscles become flabby. This deterioration seems to be caused by the great change on entering school and by the conditions of school life. After a time, a large part overcome this weakness and again acquire their former freshness. Then the curve of disease gradually rises and reaches its maxima before and after puberty([48—I, p. 173]).

No very extensive investigations in regard to diseases of school children have been made in this country. In 1873 the Massachusetts State Board of Health([68—p. 71]) began an interesting investigation, and the work has been continued in different parts of the country. Many physicians also have contributed the results of their own experience. From this fragmentary data it appears that there is a good deal of illness among American school children.

In Europe several extensive investigations of this subject have been made. Hertel([64]), whose book on Overpressure is classic, collected statistics in regard to the health of children in the high schools of Denmark, and reported the following percentage suffering from chronic complaints: Of a total of 3141 boys, 60.5 % were found healthy, 31.1 % sickly, not returned, 8.4 % ; of 1211 girls between the ages of 5 and 16, 53.1 % were healthy, 39.4 % sickly, not returned, 7.5 %. This investigation was continued afterwards by a government commission([48—I, p. 167]), who reported in regard to the health of 17,595 boys and 11,646 girls, partly of the higher schools, partly of the people's schools. Of the total number of boys, 29 % were ill. In the girls' schools, the number of sickly pupils amounted to 41 %.

In Sweden a similar commission([20]) tested the health of the children in the higher schools, and reported in regard to the health of 14,434 boys and 3,000 girls. The per cent. of illness was found to be even greater than in Denmark. Key, who directed this investigation, reported more than one third of the school children afflicted with acute or with chronic diseases, not reckoning nearsightedness. Especially among the girls was disease prevalent. An average of 61 % of them were found ill.

The most frequent diseases in the Danish schools were scrofula, anæmia, and habitual headache. Headache and nervous diseases were more frequent in the higher schools and among the older pupils. In Sweden, anæmia, headache and bleeding at the nose, formed the majority of the diseases among the boys. Among the girls, anæmia, headache, loss of appetite,and diseases of the spine were frequent, the latter occurring in the case of 10 % of the pupils.

The Danish and Swedish Commissions collected interesting data also in regard to the number of hours of school work and the number of hours of sleep of the pupils. In the Danish schools it was found that the hours of daily work (including school work and private instruction, but not the time devoted to music and gymnastics) increased from 4 to 5 hours in the *Vorschule* to 9 to 10 hours in the higher classes. The Swedish Commission found the number of hours of school work alone (not including gymnastics) amounted to from 10 to 11 hours in the upper classes of the *Gymnasium*. The number of hours of study in the girls' schools was less in both countries. The Swedish Commission found, further, that the time devoted to sleep decreased from 9 hours at first to 7 hours or a trifle more in the highest classes. Prof. Key([48–III. p. 586]) found, in Stockholm, that those children who slept less than what he deems a normal period (namely, 10 to 11 hours for younger children, 8 to 9 hours for older ones) showed, in the upper classes 5%, in the lower 8%, more cases of illness than the others. He divided the children further into those who worked less than the average daily period and those who worked more, and found 6.8% more illness among the latter than among the former.

In England extensive investigations have been made by Dr. Crichton-Browne and by Dr. Warner([58–p. 79]) in regard to the health of school children. The latter, whose report is based upon the observation of 50,000 school children, found about 10% that showed defects of development, abnormal nerve signs, or the like.

XV.—Conclusion.

Some of the demands of school hygiene may seem ideal; but the most important of them are by no means impracticable. There are few features of the ideal schoolhouse that are not to be found already in some schools. The chief difficulty is that the construction of schoolhouses is not entrusted to experts; and hence a few good features are apt to be combined with many poor ones Among the schoolhouses in this country there is a marvelous diversity. While some are opposed to every hygienic requirement, it is probably true that if all the best features to be found in different localities were combined in one building, we should have a schoolhouse unsurpassed in the world.

It is seldom impossible to obtain a good location for a schoolhouse. If essentials are deemed of prime importance and ornamentation secondary, schoolhouses can usually be properly constructed without extravagant outlay. There are several excellent systems of indirect heating and ventilation that are already in successful operation in a number of cities in this country. The expense, however, must be greater than with direct heating. With a little foresight the essential principle of unilateral lighting, *i. e.*, that at least the greater part of the light come from one side, can be observed in all classrooms. The French law, that with unilateral lighting the height of the top of the window from the floor should be two-thirds the width of the room, is by no means impracticable. It is an easy matter to have the seats so arranged that the light comes from the left. The curtains may run up from the bottom just as well as let down from the top. Cleanliness requires labor, but is a simple matter. Adjustable seats and desks are possible, just as soon as teachers and school boards appreciate the importance of physical health and the conditions upon which it depends. The advantages of a central position of the writing-book and the possibility of an upright posture have been demonstrated in a number of schools. Short periods of study, alternating with periods of recreation and exercise, few hours of home study, and plenty of sleep, are evidently the conditions of efficient mental work, and it is likely soon to be demonstrated by experiment that only by regarding these conditions can the pressing problems concerning the curricula of the primary, grammar, and high schools be solved.

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MORAL EDUCATION AND WILL-TRAINING.

By G. Stanley Hall.

A chief characteristic of contemporary psychology is to reduce most of the activities of the soul to some form of will. The more popular sayings of Schopenhauer, that the normal man is two-thirds will and only one-third intellect; of F. W. Robertson, that doing is an essential organ of knowing; of Matthew Arnold, that conduct is three-fourths of life; or of Maudsley, that both history and character are written in the habits of muscles, which constitute about one-half of the human body and are preëminently the organs of the will; of Physiologists, that a large percentage of all the energy of the body is used up by muscle work, nearly half the body by weight consisting of tissue contracting under volitional control; and of the author of *Rembrandt als Erzieher*, Ped. Sem. I, p. 61, that an age of art is now superseding that of science; these now seem to many not more but less than the truth. We are told that belief is a function, or a part, or even a product of deliberated activity, that thought is repressed action, that attention is inner will, that reason is not only dominated by the will to think, but that thought-laws are no less necessarily will-laws, and sometimes that the aimless drift of all associative thinking, and even reverie, owes the impulse by which it passes from one notion to the next to a "spontaneous will." Not only is logic subordinated to ethics, and the intellect, even its lower perceptive activities, reduced to a practical activity, or motor innervation, but even the impulsive side is no less subordinated to will. Desire, we are told, is one concept getting ahead of the rest in the struggle for the highest clearness, and ripening into volition as the rest are more or less completely overcome. So, too, wishes, interests which preform the will and which must be carefully studied and inventoried in children as its prelusory forms, or as the forefeelings of not only their capacities but of their destinies, and even feeling, some think is a process in the development of will. Thus, instead of Cicero's *vivere est cogitare*, we might now say *vivere est velle*.

With all this we are not here concerned, save to point out a tendency of contemporary thought congenial to a practical country like our own, and of special import for teachers. We raise here no speculative issue, even with those who prefer to regard the will as a finished innate faculty, or as transcendental or noumenal, as substance, prototype, matter of all things, supporting the intellect, which is only accident, ectype, form, "as a stout blind beggar carries a dwarfed and crippled but seeing one," and its every act an absolute beginning. All we say is that, so far as the will of an individual in action may be regarded as made of, or even conditioned by, consolidated traces or residua of past volitions, so that in a sense we will with all we have willed, and in a direction which is the resultant of actual ideo-motor experience, so far its laws of growth may be best observed, and later best applied. Central as the will is now regarded from whatever standpoint, a practical difference between it and the intellect is so distinct that even the three R's must, save in ideal schemes, long be taught in different ways as the one or the other is made the chief object of education. Indeed, the intellect may be so trained as to enfeeble and dissipate the will, and it is because this is so widely seen and felt that it has come to be one of the chief endeavors of educational thought to-day to go deeper and to moralize as well as to mentalize children, and to develop will as a chief factor of character—a word which meant in the original Greek, first a die or tool to stamp with, then the mark left by it, then fixed, reliable traits.

From its nature, too, as well as from its central importance, it might be easily shown, were there space, that the will is no less dependent on the culture it receives than the mind. It is fast becoming as absurd to suppose men can survive in the great practical strain to which American life subjects all who would succeed if the will is left to take its doubtful chances of training and discipline, as to suppose the mind develops in neglect. Our changed conditions make this chance of will-culture more doubtful than formerly. A generation or two ago most school-boys had either farm-work, chores, errands, jobs self-imposed, or required by less tender parents; they *made* things, either toys or tools, out of school. Most school-girls did housework, more or less of which is, like farm-work, perhaps the most varied and most salutary as well as most venerable of all schools for the youthful body and mind. They undertook extensive works of embroidery, bed-quilting, knitting, sewing, mending, if not cleaning, and even spinning and weaving their own or others' clothing, and cared for the younger children. The wealthier devised or imposed tasks for will-culture, as the German crown-prince has his children taught

a trade as part of their education. Ten days at the hoe-handle, axe, or pitchfork, said an eminent educator lately in substance, with no new impression from without, and one constant and only duty, is a schooling in perseverance and sustained effort, such as few boys now get in any shape; while city instead of country life brings so many new, heterogeneous and distracting impressions of motion rather than rest, and so many privileges with so few corresponding duties, that with artificial life and bad air the will is weakened, and eupeptic minds and stomachs, on which its vigor so depends, are rare. Machines supersede muscles, and perhaps our athleticism gives skill too great preponderance over strength, or favors intense rather than constant, long-sustained, unintermittent energy. Perhaps too many of our courses of study are better fitted to turn out many-sided but superficial paragraphists, than men who can lay deep plans, and subordinate many complex means to one remote end Meanwhile, if there is any one thing of which our industries and practical arts are in more crying need than another, it is the old-fashioned virtue of thoroughness, of a kind and degree which does not address merely the eye, is not limited by the letter of a contract, but which has some regard for its products for their own sake, and some sense for the future. Whether in science, philosophy, morals, or business, the fields for long-ranged cumulative efforts are wider, more numerous, and far more needy than in the days when it was the fashion for men contentedly to concentrate themselves to one vocation, life-work, or mission, or when cathedrals or other yet vaster public works were transmitted unfinished but ever advancing from one generation of men to another.

It is because the brain is developed, while the muscles are allowed to grow flabby and atrophied, that the deplored chasm between knowing and doing is so often fatal to the practical effectiveness of mental and moral culture. The great increase of city and sedentary life has been far too sudden for the human body—which was developed by hunting, war, agriculture, and manifold industries now given over to steam and machinery—to adapt itself healthfully or naturally to its new environment. Let any of us take down an anatomical chart of the human muscles, and reflect what movements we habitually make each day, and realize how disproportionately our activities are distributed compared with the size or importance of the muscles, and how greatly modern specialization of work has deformed our bodies. The muscles that move the scribbling pen are an insignificant fraction of those in the whole body, and those that wag the tongue and adjust the larynx are also comparatively few and

small. Their importance is, of course, not underrated, but it is disastrous to concentrate education upon them too exclusively or too early in life. The trouble is that few realize what physical vigor is in man or woman, or how dangerously near weakness often is to wickedness, how impossible healthful energy of will is without strong muscles which are its organ, or how endurance and self-control, no less than great achievement, depend on muscle-habits. Both in Germany and Greece a golden age of letters was preceded, by about a generation, by a golden age of national gymnastic enthusiasm which constitutes, especially in the former country, one of the most unique and suggestive chapters in the history of pedagogy. Symmetry and grace, hardihood and courage, the power to do everything that the human body can do with and without all conceivable apparatus, instruments, and even tools, are culture ideals that in Greece, Rome, and Germany respectively have influenced, as they might again influence, young men as intellectual ideals never can do save in a select few. We do not want "will-virtuosos," who perform feats hard to learn, but then easy to do and good for show; nor spurtiness of any sort which develops an erethic habit of work, temper, and circulation, and is favored by some of our popular sports, but too soon reacts into fatigue. Even will-training does not reach its end till it leads the young up to taking an intelligent, serious and life-long interest in their own physical culture and development. This is higher than interest in success in school or college sports; and, though naturally later than these, is one of the earliest forms of will-culture in which it is safe and wise to attempt to interest the young for its own sake alone. In our exciting life and trying climate, in which the experiment of civilization has never been tried before, these thoughts are merely exercises.

But this is of course preliminary. Great as is the need, the practical difficulties in the way are very great. First, there are not only no good text-books in ethics, but no good manual to guide teachers. Some give so many virtues or good habits to be taught per term, ignoring the unity of virtue as well as the order in which the child's capacities for real virtue unfold. Advanced text-books discuss the grounds of obligation, the nature of choice or freedom, or the hedonistic calculus, as if pleasures and pains could be balanced as measurable quantities, etc., so that philosophic morality is clearly not for children or teachers. Secondly, evolution encourages too often the doubt whether virtue can be taught when it should have the opposite effect. Perversity and viciousness of will are too often treated as constitutional disease, and insubor-

dination or obstinacy, especially in school, are secretly admired as strength, instead of being vigorously treated as crampy disorders of will, and the child is coddled into flaccidity. Because the lowest develops first, there is danger that it will interfere with the development of the higher, and thus, if left to his own, the child may come to have no will. The third and greatest difficulty is, that with the best effort to do so, so few teachers can separate morality from religious creed. So vital is the religious sentiment here that it is hard to divorce the end of education from the end of life, proximate from ultimate grounds of obligation, or finite from infinite duties. Those whose training has been more religious than ethical can hardly teach morality *per se* satisfactorily to the *noli me tangere* spirit of denominational freedom so wisely jealous of conflicting standards and sanctions for the young.

How then can we ever hope to secure proper training for the will? Two ways suggest themselves: First, we may try to assume, or tediously enucleate a concensus of religious truth as a basis of will training, *e. g.*, God and immortality, and, ignoring the minority who doubt these, vote them into the public school. Pedagogy need have nothing whatever to say respecting the absolute truth or falsity of these ideas, but there is little doubt that they have an influence on the will, at a certain stage of average development, greater and more essential than any other; so great that even were their vitality to decay like the faith in the Greek or German mythology, we should still have to teach God and a future life as the most imperative of all hypotheses in a field where, as in morals, nothing is so practical as a good theory; and we should have to fall to teaching the Bible as a moral classic, and cultivate a critical sympathy for its view of life. But this way ignores revelation and supernatural claims, while some have other objections to emancipating or "rescuing" the Bible from theology just yet. Indeed, the problem how to teach anything that the mind could not have found out for itself, but that had to be revealed, has not been solved by modern pedagogy, which, since Pestalozzi, has been more and more devoted to natural and developing methods. The latter teaches that there must not be too much seed sown, too much or too high precept, or too much iteration, and that, in Jean Paul's phrase, the hammer must not rest on bell, but only tap and rebound, to bring out a clear tone. Again, a consensus of this content would either have to be carefully defined and would be too generic and abstract for school uses, or else differences of interpretation, which so pervade and are modified by character, culture, temperament, and

feeling, would make the concensus itself nugatory. Religious training must be specific at first, and, omitting qualifications, the more explicit the denominational faith the earlier religious motives may affect the will.

This is the way of our hopes, to the closer consideration of which we intend to return in the future, though it must be expected that the happiest concensus will be long quarantined from most schools. Meanwhile a second way, however unpromising, is still open. Noble types of character may rest on only the native instincts of the soul or even on broadly interpreted utilitarian considerations. But if morality without religion were only a bloodless corpse or a plank in a shipwreck, there is now need enough for teachers to study its form, drift, and uses by itself alone. This, at least, is our purpose in considering the will, and this only.

. . . . . .

The only duty of small children is habitual and prompt obedience. Their will, purpose, and even mood when alone, are fickle, fluctuating, contradictory. Our very presence imposes one general law on them, viz., that of keeping our good will and avoiding our displeasure. As the plant grows towards the light, so they unfold in the direction of our wishes, felt as by divination. They respect all you smile at, even buffoonery; look up in their play to call your notice, to study the lines of your sympathy, as if their chief vocation was to learn your desires. Their early lies are often saying what they think will please us knowing no higher touchstones of truth. If we are careful to be wisely and without excess happy and affectionate when they are good, and saddened and slightly cooled in manifestations of love if they do wrong, the power of association in the normal, eupeptic child will early choose right as surely as pleasure increases vitality. If our love is deep, obedience is an instinct if not a religion. The child learns that while it cannot excite our fear, resentment or admiration, etc., it can act on our love, and this should be the first sense of its own efficiency. Thus, too, it first learns that the way of passion and impulse is not the only rule of life, and that something is gained by resisting them. It imitates our acts long before it can understand our words. As if it felt its insignificance, and dreaded to be arrested in some lower phase of its development, its instinct for obedience becomes almost a passion. As the vine must twine or grovel, so the child comes unconsciously to worship idols, and imitates bad patterns and examples in the absence of worthy ones. He obeys as with a deep sense of being our chattel, and at bottom admires those who coerce him, if the means be wisely chosen. The authority

must, of course, be ascendancy over heart and mind. The more absolute such authority the more the will is saved from caprice and feels the power of steadiness. Such authority excites the unique, unfathomable sense of reverence, which measures the capacity for will-culture, and is the strongest and soundest of all moral motives. It is also the most comprehensive, for it is first felt only towards persons, and personality is a vinculum, enabling any number of complex elements to act or be treated as a whole, as everything does and is in the child's soul, instead of in isolation and detail. In the feeling of respect culminating in worship almost all educational motives are involved, but especially those which alone can bring the will to maturity; and happy the child who is bound by the mysterious and constraining sympathy of dependence, by which, if unblighted by cynicism, a worthy mentor directs and lifts the will. This unconscious reflection of our character and wishes is the diviner side of childhood, by which it is quick and responsive to everything in its moral environment. The child may not be able to tell whether its teacher often smiles, dresses in this way or that, speaks loud or low, has many rules or not, though every element of her personality effects him profoundly. His acts of will have not been *choices*, but a far greater mass of psychic causes than consciousness can estimate have laid a basis of character, than which heredity alone is deeper, before the child knows he has a will. These influences are not transient but life-long, for if the conscious and intentional may anywhere be said to be only a superficial wave over the depths of the unconscious, it is in the sphere of will-culture.

But command and obedience must also be specific to supplant nature. Here begins the difficulty. A young child can know no general commands. "Sit in your chair," means sit a moment, as a sort of trick, with no prohibition to stand the next instant. Any just-forbidden act may be done in the next room. All is here and now, and patient reiteration, till habit is formed, and no havoc-making rules which it cannot understand or remember, is our cue. Obedience can, however, be instinct even here, and is its chief virtue, and there is no more fear of weakening the will by it than in the case of soldiers. As the child grows old, however, and as the acts commanded are repugnant, or unusual, there should be increasing care, lest authority be compromised, sympathy ruptured, or lest mutual timidity and indecision, if not mutual insincerity and dissimulation, as well as parodied disobedience, etc., to test us, result. We should, of course, watch for favorable moods, assume no unwonted or preternatural dignity or owlish air of wisdom, and command in a low voice which does

not too rudely break in upon the child's train of impressions. The acts we command or forbid should be very few at first, but inexorable. We should be careful not to forbid where we cannot follow an untrusty child, or what we cannot prevent. Our own will should be a rock and not a wave. Our requirements should be uniform, with no whim, mood, or periodicity of any sort about them. If we alternate from caresses to severity, are fickle and capricious instead of commanding by a fixed and settled plan, if we only now and then take the child in hand, so he does not know precisely what to expect, we really require the child to change its nature with every change in us, and well for the child who can defy such a changeable authority, which not only unsettles but breaks up character anew when it is just beginning to inspissate. Neglect is better than this, and fear of inconsistency of authority makes the best parents often jealous of arbitrariness in teachers. Only thus can we develop general habits of will and bring the child to know general maxims of conduct inductively, and only thus by judicious boldness and hardihood in command can we bring the child to feel the conscious strength that comes only from doing unpleasant things. Even if instant obedience be only external at first, it will work inward, for moods are controlled by work, and it is only will which enlarges the bounds of personality.

Yet we must not forget that even morality is relative, and is one thing for adults and often quite another for children. The child knows nothing of absolute truth, justice, or virtues. The various stimuli of discipline are to enforce the higher though weaker insights the child has already unfolded, rather than to engraft entirely unintuited good. The command must find some ally, feeble though it be, in the child's own soul. We should strive to fill each moment with as little sacrifice or subordination as mere means or conditions to the future as possible, for fear of affectation and insincerity. But yet the hardier and sounder the nature, the more we may address training to barely nascent intuitions, with a less ingredient of immediate satisfaction, and the deeper the higher element of interest will be grounded in the end. The child must find as he advances towards maturity, that every new insight or realization of his own reveals the fact that you have been there before with commands, cultivating sentiments and habits, and not that he was led to mistake your convenience or hobby for duty, or failed to temper the will by temporizing with it. The young are apt to be most sincere at an age when they are also most mistaken, but if sincerity be kept at its deepest and best, error will be least harmful and easiest overcome. If authority supplement rather

than supersede good motives, the child will so love authority as to overcome your reluctance to apply it directly, and as a final result will choose the state and act you have pre-formed in its slowly-widening margin of freedom, and will be all the less liable to undue subservience to priest or boss, or fashion or tradition later, as obedience gives place to normal, manly independence.

In these and many other ways everthing in conduct should be mechanized as early and completely as possible. The child's notion of what is right is what is habitual, and the simple, to which all else is reduced in thought, is identified with the familiar. It is this primitive stratum of habits which principally determines our deepest beliefs—which all must have over and above knowledge—to which men revert in mature years from youthful vagaries. If good acts are a diet and not a medicine, are repeated over and over again, as every new beat of the loom pounds in one new thread, and a sense of justice and right is wrought into the very nerve-cells and fibres; if this ground texture of the soul, this "memory and habit-plexus," this sphere of thoughts we oftenest think and acts we oftenest do, is early, rightly and indiscerptibly wrought, not only does it become a web of destiny for us, so all-determining is it, but we have something perdurable to fall back on if moral shock or crisis or change or calamity shall have rudely broken up the whole structure of later associations. Not only the more we mechanize thus, the more force of soul is freed for higher work, but we are insured against emergencies in which the choice and deed is likely to follow the nearest motive, or that which acts quickest, rather than to pause and be influenced by higher and perhaps intrinsically stronger motives. Reflection always brings in a new set of later-acquired motives and considerations, and if these are better than habit-mechanism, then pause is good; if not, he who deliberates is lost. Our purposive volitions are very few compared with the long series of desires, acts and reactions, often contradictory, many of which were never conscious, and many once willed but now lapsed to reflexes, the traces of which crowding the unknown margins of the soul, constitute the organ of the conscious will.

It is only so far as this primitive will is wrong by nature or training, that drastic reconstructions of any sort are needed. Only those who mistake weakness for innocence, or simplicity for candor, or forget that childish faults are no less serious because universal, deny the at least occasional depravity of all children, or fail to see that fear and pain are among the indispensables of education, while a parent, teacher, or even a God, all love, weakens and relaxes the will.

Children do not cry for the alphabet; the multiplication table is more like medicine than confectionery, and it is only affected thoroughness that omits all that is hard. "The fruits of learning may be sweet, but its roots are always bitter," and it is this alone that makes it possible to strengthen the will while instructing the mind. The well-schooled will comes, like Herder, to scorn the luxury of knowing without the labor of learning. We must anticipate the future penalties of sloth as well as of badness. The will especially is a trust we are to administer for the child, not as he may now wish, but as he will wish when more mature. We must now compel what he will later wish to compel himself to do. To find his habits already formed to the same law that his mature will and the world later enjoin, cements the strongest of all bonds between mentor and child. Nothing, however, must be so individual as punishment. For some a threat at rare intervals is enough, while for others, however ominous threats may be, they become at once "like scarecrows, on which the foulest birds soonest learn to perch." To scold well and wisely is an art by itself. For some children pardon is the worst punishment; for others, ignoring or neglect; for others, isolation from friends, suspension from duties; forothers, seclusion—which last, however, is for certain ages beset with extreme danger—and for still others, shame from being made conspicuous. Mr. Spencer's "natural penalties" can be applied to but few kinds of wrong, and those not the worst. Basedow tied boys who fell into temptation to a strong pillar to brace them up; if stupid and careless, put on a fool's cap and bells; if they were proud, they were suspended near the ceiling in a basket, as Aristophanes represented Socrates. Two boys who quarreled, were made to look into each other's eyes before the whole school till their angry expressions gave way before the general sense of the ridiculous. This is more ingenious than wise. The object of discipline is to avoid punishment, but even flogging should never be forbidden. It may be reserved, like a sword in its scabbard, but should not get so rusted in that it cannot be drawn on occasion. The law might even limit the size and length of the rod, and place of application, as in Germany, but it should be of no less liberal dimensions here than there. Punishment should, of course, be minatory, and reformatory, and not vindictive, and we should not forget that certainty is more effective than severity, nor that it is apt to make motives sensuous, and delay the psychic restraint which should early preponderate over the physical. But will-culture for boys is rarely as thorough as it should be without more or less flogging. I would not, of course, urge the extremes of the past. The

Spartan beating as a gymnastic drill to toughen, the severity which prevailed in Germany for a long time after its Thirty Years' War,[1] the former fashion in so many English schools of walking up not infrequently to take a flogging as a plucky thing to do, and with no notion of disgrace attaching to it, shows at least an admirable strength of will. Severe constraint gives poise, inwardness, self-control, inhibition, and *noluntas*, if not *voluntas*, while the now too common habit of coquetting for the child's favor, and tickling its ego with praises and prizes, and pedagogic pettifogging for its good will, and sentimental fear of a judicious slap to rouse a spoiled child with no will to break, to make it keep step with the rest in conduct, instead of delaying a whole school-room to apply a subtle psychology of motives on it, is bad. This reminds one of the brahmin who sweeps the ground before him lest he unconsciously tread on a worm. Possibly it may be well, as Schleiermacher suggests, not to repress some one nascent bad act in some natures, but let it and the punishment ensue for the sake of Dr. Spanckster's tonic. Dermal pain is not the worst thing in the world, and by a judicious knowledge of how it feels at both ends of the rod, by flogging and being flogged, far deeper pains may be forefended. Insulting defiance, deliberative disobedience, ostentatious carelessness and bravado, are diseases of the will, and, in very rare cases of Promethean obstinacy, the severe process of breaking the will is needful, just as in surgery it is occasionally needful to rebreak a limb wrongly set, or deformed, to set it over better. It is a cruel process, but a crampy will in childhood means moral traumatism of some sort in the adult. Few parents have the nerve to do this, or the insight to see just when it is needed. It is, as some one has said, like knocking a man down to save him from stepping off a precipice. Even the worst punishments are but very faint types of what nature has in store in later life for some forms of perversity of will, and are better than sarcasm, ridicule, or tasks, as penalties. The strength of obstinacy is admirable,

[1] Those interested in school statistics may value the record kept by a Swabian schoolmaster named Hauberle, extending over fifty-one years and seven months' experience as a teacher, as follows: 911,527 blows with a cane; 124,010 with a rod; 20,989 with a ruler; 136,715 with the hand; 10,295 over the mouth; 7,905 boxes on the ear; 1,115,800 snaps on the head; 22,763 nota benes with Bible, catechism, hymn-book and grammar; 777 times boys had to kneel on peas; 613 times on triangular blocks of wood; 5,001 had to carry a timber mare; and 1,701 hold the rod high; the last two being punishments of his own invention. Of the blows with the cane 800,000 were for Latin vowels, and 76,000 of those with the rod for Bible verses and hymns. He used a scolding vocabulary of over 3,000 terms, of which one-third were of his own invention.

and every one ought to have his own will; but a false direction, though almost always the result of faulty previous training, when the soul was more fluid and mobile, is all the more fatal. While so few intelligent parents are able to refrain from the self-indulgence of too much rewarding or giving, though it injures the child, it is perhaps too much to expect the hardihood which can be justly cold to the caresses of a child who seeks, by displaying all its stock of goodness and arts of endearment, to buy back good-will after punishment has been deserved. If we wait too long, and punish in cold blood, a young child may hate us; while, if we punish on the instant, and with passion, a little of which is always salutary, on the principle, *ohne Affect kein Effect*, an older child may fail of the natural reactions of conscience, which should always be secured. The maxim, *summum jus summa injuria*, we are often told, is peculiarly true in school, and so it is; but to forego all punishment is no less injustice to the average child, for it is to abandon one of the most effective means of will-culture. We never punish but a part, as it were, of the child's nature; he has lied, but is not therefore a liar, and we deal only with the specific act, and must love all the rest of him.

And yet, after all, indiscriminate flogging is so bad, and the average teacher is so inadequate to that hardest and most tactful of all his varied duties, viz., selecting the right outcrop of the right fault of the right child at the right time and place, mood, etc., for best effect, that the bold statement of such principles as above is perhaps not entirely without practical danger, especially in two cases which Madame Necker and Sigismund have pointed out, and several cases of which the present writer has notes. First, an habitually good child sometimes has a saturnalia of defiance and disobedience; a series of insubordinate acts are suddenly committed which really mark the first sudden epochful and belated birth of the instinct of independence and self-regulation, on which his future manliness will depend. He is quite irresponsible, it is never repeated, and very lenient treatment causes him, after the conflict of tumultuous feelings has expanded his soul, to react healthfully into habitual docility again, if some small field for independent action be at once opened him. The other case is that of *ennui*, of which children suffer such nameless qualms. When I should open half a dozen books, start for a walk, and then turn back, wander about in mind or body, seeking but not finding content in anything, a child in my mood will wish for a toy, an amusement, food, a rare indulgence, only to neglect or even reject it petulantly when granted. These flitting "will-spectres" are

physical, are a mild form of the many fatal dangers of fatigue; and punishment is the worst of treatment. Rest or diversion is the only cure, and the teacher's mind must be fruitful of purposes to that end. Perhaps a third case for palliative treatment is, those lies which attend the first sense of badness. The desire to conceal it occasionally accompanies the nascent effort to reform and make the lie true. These cases are probably rare, while the temptation to lie is far greater for one who does ill than for one who does well, for fear is the chief motive, and a successful lie which concealed would weaken the desire to cure a fault.

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We have thus far spoken of obedience, and come now to the later necessity of self-guidance, which, if obedience has wrought its perfect work, will be natural and inevitable. It is very hard to combine reason and coercion, yet it is needful that children think themselves free long before we cease to determine them. As we slowly cease to prescribe and begin to inspire, a very few well-chosen mottoes, proverbs, maxims, should be taught very simply, so they will sink deep. Education has been defined as working against the chance influences of life, and it is certain that without some precepts and rules the will will not exert itself. If reasons are given, and energy is much absorbed in understanding, the child will assent but will not do. If the mind is not strong, many wide ideas are very dangerous. Strong wills are not fond of arguments, and if a young person falls to talking or thinking beyond his experience, subjective or objective, both conduct and thought are soon confused by chaotic and incongruous opinions and beliefs; and false expectations, which are the very seducers of the will, arise. There can be little will-training by words, and the understanding cannot realize the ideals of the will. All great things are dangerous, as Plato said, and the truth itself is not only false but actually immoral to unexpanded minds. Will-culture is intensive, not extensive, and the writer knows a case in which even a vacation ramble with a moralizing rabulist has undermined the work of years. Our precepts must be made very familiar, copiously illustrated, well wrought together by habit and attentive thought, and above all clear cut, that the pain of violating them may be sharp and poignant. Vague and too general precepts beyond the horizon of the child's real experience do not haunt him if they are outraged. Now the child must obey these, and will if he has learned to obey well the command of others.

One of the best sureties that he will do so is muscle-culture, for if the latter are weaker than the nerves and brain, the gap

between knowing and doing appears and the will stagnates. Gutsmuths, the father of gynastics in Germany before Jahn, used to warn men not to fancy that the few tiny muscles that moved the pen or tongue had power to elevate men. They might titillate the soul with words and ideas, but rigorous, symmetrical muscle-culture alone, he and his Turner societies believed, could regenerate the Fatherland, for it was one thing to paint the conflict of life, and quite another to bear arms in it. They said, "The weaker the body the more it commands; the stronger it is the more it obeys."

In this way we shall have a strong, well-knit soul-texture, made up of volitions and ideas like warp and woof. Mind and will will be so compactly organized that all their forces can be brought to a single point. Each concept or purpose will call up those related to it, and once strongly set toward its object, the soul will find itself borne along by unexpected forces. This power of totalizing, rather than any transcendent relation of elements, constitutes at least the practical unity of the soul, and this unimpeded association of its elements is true or inner freedom of will. Nothing is wanting or lost when the powers of the soul are mobilized for a great task, and its substance is impervious to passion. With this organization men of really little power accomplish wonders. Without it great minds are confused and lost. They have only velleity or caprice. The will makes a series of vigorous, perhaps almost convulsive, but short, inconsistent efforts. As Jean Paul says, there is sulphur, charcoal, and saltpetre in the soul, but powder is not made, for they never find each other. To understand this will-plexus is preëminent among the new demands now laid on educators.

But, although this focalizing power of acting with the whole rather than with a part of the soul, gives independence of many external, conventional, proximate standards of conduct, deepening our interests in life, and securing us against disappointment by defining our expectations, while such a sound and simple will-philosophy is proof against considerable shock and has firmness of texture enough to bear much responsibility, there is, of course, something deeper, without which all our good conduct is more or less hollow. This is, of course, that better purity established by mothers in the plastic heart, before the superfœtation of precept is possible, or even before the "soul takes flight in language;" it is perhaps pre-natal or hereditary. Much every way depends on how aboriginal our goodness is, whether the will acts with effort, as we solve an intricate problem in solitude, or as we say the multiplication table, which only much distraction can confuse, or as we repeat the alphabet, which the din of battle

could not hinder. Later and earlier training should harmonize with each other and with nature. Thrice happy he who is so wisely trained that he comes to believe he believes what his soul deeply does believe, to say what he feels and feel what he really does feel, and chiefly whose express volitions square with the profounder drift of his will as the resultant of all he has desired or wished, expected, attended to, or striven for. When such an one comes to his moral majority by standing for the first time upon his own careful conviction, against the popular cry, or against his own material interests or predacious passions, and feels the constraint and joy of pure obligation which comes up from this deep source, a new, original force is brought into the world of wills. Call it inspiration, or Kant's transcendental impulse above and outside of experience, or Spencer's deep reverberations from a vast and mysterious past of compacted ancestral experiences, the most concentrated, distilled and instinctive of all psychic products, and as old as Mr. Tyndall's "fiery cloud,"—the name or even source is little. We would call it the purest, freest, most prevailing, because most inward, will or conscience.

This free, habitual guidance by the highest and best, by conviction with no sense of compulsion or obligation, is an impractical if not dangerous ideal, for it can be actually realized only by the rarest moral genius. For most of us the best education is that which makes us the best and most obedient servants. This is the way of peace and the way of nature, for even if we seriously try to keep up a private conscience at all, apart from feeling, faction, party or class spirit, or even habit, which are our habitual guides, the difficulties are so great that most hasten, more or less consciously and voluntarily, to put themselves under authority again, reserving only the smallest margin of independence in material interests, choice of masters, etc., and yielding to the pleasing and easy illusion that inflates the minimum to seem the maximum of freedom, and uses the noblest ideal of history, viz., that of pure autonomous oughtness, as a pedestal for idols of selfishness, caprice and conceit. The trouble is in interpreting these moral instincts, for even the authorities lack the requisite self-knowledge in which all wisdom culminates. The moral interregnum which the *Aufklärung* has brought will not end till these instincts are rightly interpreted by intelligence. The richest streams of thought must flow about them, the best methods must peep and pry till their secrets are found and put into the idea-pictures in which most men think.

This brings us, finally, to the highest and also immediately

practical method of moral education, viz., training the will by and for intellectual work. Youth and childhood must not be subordinated as means to maturity. Learning is more useful than knowing. It is the way and not the goal, the work and not the product, the acquiring and not the acquisition, that educates will and character. To teach only results, which are so simple, without methods by which they were obtained, which are so complex and hard, to develop the sense of possession without the strain of activity, to teach great matters too easily or even as play, to always wind along the lines of least resistance into the child's mind, is simply to add another and most enervating luxury to child-life. Only the sense and power of effort, which made Lessing prefer the search to the possession of truth, which trains the will in the intellectual field, which is becoming more and more the field of its activity, counts for character and makes instruction really educating. This makes mental work a series of acts, or living thoughts, and not merely words. Real education, that we can really teach, and that which is really most examinable, is what we do, while those who acquire without effort may be extremely instructed without being truly educated.

It is those who have been trained to put forth mental power that come to the front later, while it is only those whose acquisitions are not transpeciated into power who are in danger of early collapse.

It is because of this imperfect appropriation through lack of volitional reaction that mental training is so often dangerous, especially in its higher grades. Especially wherever good precepts are allowed to rest peacefully beside bad discarded habits, moral weakness is directly cultivated. Volitional recollection, or forcing the mind to reproduce a train of impressions, strengthens what we may call the mental will; while if multifarious impressions which excite at the time are left to take their chances, at best fragmentary reproduction, incipient amnesia, the prelude of mental decay, may be soon detected. Few can endure the long working over of ideas, especially if at all fundamental, which is needful to full maturity of mind, without grave moral danger. New standpoints and ideas require new combinations of the mental elements, with constant risk that during the process, what was already secured will fall back into its lower components. Even our immigrants suffer morally from the change of manners and customs and ideas, and yet education means change; the more training the more change, as a rule, and the more danger during the critical transition period while we oscillate between control by old habits, or association within the old circle of thought, and by the new insights, as a medical stu-

dent often suffers from trying to bring the regulation of his physical functions under new and imperfect hygienic insights. Thus most especially if old questions, concerning which we have long since ceased to trust ourselves to give reasons, need to be reopened, there is especial danger that the new equilibrium about which the dynamic is to be re-resolved into static power will be established, if at all, with loss instead of with gain. Indeed, it is a question not of schools but of civilization, whether mental training, from the three R's to science and philosophy, shall really make men better, as the theory of popular education assumes, and whether the genius and talent of the few who can receive and bear it can be brought to the full maturity of a knowledge fully facultized—a question paramount, even in a republic, to the general education of the many.

The illusion is that beginnings are hard. They are easy. Almost any mind can advance a little ways into almost any subject. The feeblest youth can push on briskly a little way into a new subject, but he forgets, and so does the examiner who marks him, that difficulties increase not in arithmetical but in almost geometrical ratio as he advances. The fact, too, that all topics are taught by all teachers and that we have no specialized teaching in elementary branches, the placing of examination in the most debilitating part of our peculiarly debilitating Spring, these help us to solve the problem which China has solved so well, viz., how to instruct and not to educate. A pass mark, say of fifty, should be given not for mastery of the first half of the book, or for knowledge of half the matter in it, but for that of three-fourths or more. Suppose one choose the easier method of tatooing his mind by attaining the easy early stages of proficiency in many subjects, as is possible and even encouraged in too many of our school and college curricula, he weakens the will-quality of his mind. Smattering is dissipation of energy. Only great, concentrated and prolonged efforts in one direction really train the mind, because only they train the will beneath it. Many little, heterogeneous efforts of different sorts, as some one has said in substance, leave the mind like a piece of well-used blotting paper, and the will like a rubber band stretched to flaccidity around one after another bundle of objects too large for it to clasp into unity. *In der Beschränkung zeigt sich der Meister;* all-sidedness through one-sidedness ; by staking the horse or cow out in the spring-time, till he gnaws his small allotted circle of grass to the ground, and not by roving and cropping at will, can he be taught that the sweetest joint is nearest the root;—are convenient symbols of will-culture in the intellectual field. Even a long cram, if only on one subject, which brings out

the relations of the parts, or a "one-study college," as is already devised in the West, or the combination of several subjects even in primary school grades into a "concentration series," as devised by Ziller and Rein, the university purpose as defined by Zeller of so combining studies that each shall stand in the course next to that with which it is inherently closest connected by matter and method, or the requirements of one central and two collateral branches for the doctorate examination;—all these devices no doubt tend to give a sense of efficiency, which is one of the deepest and proudest joys of life, in the place of a sense of possession so often attended by the exquisite misery of conscious weakness. The unity of almost any even ideal purpose is better than none, if it tend to check the superficial one of learning to repeat again or of boxing the whole compass of sciences and liberal arts, as so many of our high-schools or colleges attempt.

Finally, in the sphere of mental productivity and originality, a just preponderance of the will-element makes men distrust new insights, quick methods, and short cuts, and trust chiefly to the genius of honest and sustained work, in power of which perhaps lies the greatest intellectual difference between men. When ideas are ripe for promulgation they have been condensed and concentrated, thought traverses them quickly and easily—in a word, they have become practical, and the will that waits over a new idea patiently and silently, without anxiety, even though with a deepening sense of responsiblility, till all sides have been seen, all authorities consulted, all its latent mental reserves heard from, is the man who "talks with the rifle and not with the water-hose," or, in a rough farmer's phrase, "boils his words till he can give his hearers sugar and not sap." Several of the more important discoveries of the present generation, which cost many weary months of toil, have been enumerated in a score or two of lines, so that every experimenter could set up his apparatus and get the results in a few minutes. Let us not forget that in most departments of mental work the more we revise and reconstruct our thought, the longer we inhibit its final expression, the oftener we return to it refreshed from other interests, the clearer and more permeable for other minds it becomes, because the more it tends to express itself in terms of willed action, which is "the language of complete men."

A NATIONAL PHYSICAL LABORATORY.

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To call attention to the great extent to which our material comfort and advantage and the progress of civilization depend upon the results of scientific investigation, would, in these latter days of the Nineteenth Century, be to give utterance to a commonplace. Every artificial construction, from a foot-bridge over a brook to an arch over the Mississippi, from a cottage to the dome of a Capitol, from a wheel-barrow to a hundred-ton locomotive, from a canoe to an ocean steamer, depends for its safety and success upon a sufficient knowledge of the strength of materials, and of the physical laws governing rest and motion. Our steam-engines and water-wheels, our telegraphs and telephones, our electric lights and railways, all depend upon the laws of physics, the better knowledge of which will directly contribute to the improvement of these great aids to our convenience and happiness.

The people of this country are popularly supposed to stand among the first in their appreciation of the benefits of science. Our government has extended its hand to the support of special branches of scientific work, which were especially necessary to the welfare of the people, and which required to be prosecuted on a large scale. Such are the Coast and Geodetic Survey, which determines the form and position of the parts of our country; the Geological Survey, which, in addition to the form, tells us what the nature of our land is, and what it contains; the Weather Bureau, which not only furnishes us with important data with respect to the climate of the various portions of the country, but each day tells us what weather we may expect. The Bureau of Weights and Measures, representing a function of government only less important than the regulation of the coinage, but in this country put in charge of the Coast Survey, and the National Astronomical Observatory, are further examples of state scientific establishments. All these departments are concerned principally with the accurate measurement of quanti-

ties, which gives them a certain nature in common, distinguishing them from branches of the purely observational and descriptive sciences, such as Biology.

In view of the above facts, it seems strange that the government supports no distinct institution devoted to the cultivation and furtherance of that great mother-science, which includes all that has been mentioned, the great measuring-science Physics. Why have we no National Physical Laboratory? Answers of various sorts might be made. In the first place, the development of physics as an exact science, has been comparatively recent, and its study, as a subject by itself, is so new that many fairly-educated persons to whom the words Geology or Chemistry convey distinct suggestions, receive from the term Physics no idea at all. Furthermore, physical laboratories are decidedly new affairs. I believe it would be no exaggeration to say that twenty years ago there was not in this country a single building devoted solely to the purposes of a physical laboratory. Most of the large college laboratories have been erected within the last ten years, and now we have some half-dozen that will compare well with any university laboratories in Europe. Perhaps, therefore, it is but natural that the government has not yet instituted such an establishment. The time, however, now seems ripe. The line of activity of the institution would be manifold. To mention some of its practical fields of work, it would examine the physical properties of various materials used in the arts and trades—for instance, of various sorts of iron, steel and copper, demanded by the electrical industry. Experiments would be made upon new alloys, and their fitness for technical applications. A great department would be the testing and standardizing of measuring instruments of various sorts. This is obviously a function of government as much as the regulation of coinage. As in trade no one thinks of taking in payment pieces of gold or silver stated to have certain values, but demands coins stamped by the government, so we should not be, and are not satisfied with measures and weights issued by irresponsible parties, but demand a verification by state authority. Similar considerations apply to other measures of all sorts. The electrical trade, which has in the past few years made such tremendous strides, calls for a great number of instruments of measurement, most of which are at present graduated without control by anyone except their makers. We all know by sad experience how irregular our gas-meters are liable to be in their indications, and how inclined they are to count up quantities of gas when our houses are closed. On their part the gas companies complain of errors to their disadvantage. Shall we be obliged to suffer

the same inconvenience with the electric light? With electric measurements capable of being made with the precision that they have now reached, how long shall we put up with instruments of an accuracy depending only on the sweet will of their makers, and often giving indications wrong by ten per cent.? Why should we pay for light by the lamp-hour without having it specified how brightly the lamp is to burn? Authoritative testing of the measuring instruments would remedy these uncertainties. Further, the testing of the performance of dynamos and electric motors would be performed in a laboratory such as is proposed.

When the dynamos to be used in the electrical executions in New York were procured, it was necessary that they should be tested in order to determine under what conditions they would produce the current and pressure which had been decided upon. There being no public laboratory, either of the State of New York or of the General Government, the tests were carried out at the physical laboratory of the Johns Hopkins University, which has excellent facilities for such tests. Many of the colleges and technical schools also engage in the testing of electrical apparatus, and it may be asked why it should not be left to them. It seems clear however, that the duty of college professors and instructors consists in the instruction of the students committed to them, and preeminently in the advancement of the sciences which they profess, rather than in the earning of fees by making electrical tests or chemical analyses. For these purposes special establishments not engaged in teaching are better adapted.

Enough has perhaps been said as to the practical side. There exists, however, a higher point of view, namely, that looking to the performance of research destined to advance the pure science of Physics. This appeals less strongly to our public, but is equally important. The achievement of Michelson in counting the number of light waves in the length of a meter with an accuracy of one in several millions, or of Rowland in the production of his magnificent photographs of the spectrum, make far less impression upon the mind of the public at large than the trumpet-heralded achievements of a newspaper "Wizard," but they shed a brighter lustre upon American science. Americans are willing to vote thousands of dollars for the construction of light-houses, but are inclined to ask what the use is of determining the velocity of light with five-figure accuracy. This is a national defect, due to our youth as a nation and our devotion hitherto to the practical business of life. But we are growing up, we have achieved material success, and it is not now too much to ask that we

appreciate things whose value cannot be given in dollars and cents.

It is evident that the advance of pure science reacts in a marked degree upon and is the necessary precursor of advance in applied science. There could have been no Morse without a Henry, no Siemens or Edison without a Faraday. It should be a matter of national pride that America should furnish her share, as she has not yet done, to the advancement of pure science. If it be said that this is not a function of the State, but that it may safely be left to the universities to carry on research in the more recondite fields of science, it may be answered that there are many important investigations in physics, such as the accurate measurement of many of the constants of nature, which involve apparatus so refined and extensive, together with such an amount of continuous work, as to put them practically beyond the means of privately endowed institutions. It is also unfortunately true that the time of most of our professors is so taken up with teaching as not to allow them opportunity for long-continued investigation. That America has not yet contributed her full share to the advancement of pure science, is by no means due to a lack of capability, as the achievements of many of our countrymen have shown, and there is no reason to doubt that a national laboratory would produce work that would at once do honor to our national reputation.

As an example of the high grade of work done by our government scientific institutions may be mentioned the work of the Coast and Geodetic Survey, and valuable testimony to appreciation from abroad is to be found in the fact that the French Academy of Sciences has recently awarded one of its most highly-prized gold medals to our Geological Survey for the excellence of its scientific work. As an instance of the sort of work that might well be done in a national laboratory such as I have suggested, may be mentioned the research on the relation of the meter to the wave-length of light that Prof. Michelson is soon to complete at Paris. Here is a research planned and executed by an American physicist, with an instrument constructed by American artists, which might well have been carried out in an American laboratory, but which is now to be done in an international laboratory with funds provided by a dozen nations, of which this country is only one.

Physical work is now done in Washington in the following Government Institutions: the Coast and Geodetic Survey, including the Bureau of Weights and Measures, the Naval Observatory, and the Magnetic Observatory but recently established. The Geological Survey maintains a small physical

laboratory, where excellent work has been done. More or less direct physical research is also done by the Weather Bureau. The establishment of a central laboratory would facilitate the work of all the above, though it need not supersede them. Finally, by the efforts of one who stands among those whose names are best known in Europe to the credit of American science, Professor Langley, now of the Smithsonian Institution, there is now being opened in Washington an observatory for the study of the physics of the sun and stars. In this we are but following in the steps of Germany and France, whose astro-physical observatories at Potsdam and Meudon are splendid examples of government support of research. The writer has but recently learned that as long ago as 1884 a Committee of the National Academy of Sciences recommended to Congress the establishment of a Government research and standardizing physical laboratory. What ever came of the recommendation is to him unknown, and he has therefore taken the liberty of putting forth this plea, having been stimulated thereto by watching the development of a similar institution in Germany. While we, who pride ourselves on our practicality and interest in science, have been waiting, conservative Germany has gone ahead and completed the most splendid institution of the kind now existing. It is the purpose of this article to give, as a chief argument in favor of carrying out the suggestion made therein, a description of the new Imperial Physico-Technical Institute in Charlottenburg, Berlin.

In May 1875, as a result of the international agreement entered into by eighteen nations of Europe and America, the International Committee of Weights and Measures was constituted, and erected its fine laboratory in the park of St. Cloud, near Paris, for the purpose of constructing international standards of the metric system for the various nations. Germany had but recently adopted the metric system and had established her *Normal-Aichungs-Commission*, or Standards Bureau, with a new and complete laboratory in Berlin, the work of which took rank with that done in the International Laboratory in Paris.

Notwithstanding this, it was felt that a more general institution of larger scope was needed. The suggestion of a state institution for the furtherance of Physical Science and "*Präcisionstechnik*," or methods of accurate mechanical construction and measurement, was made twenty years ago in Prussia, and attracted wide-spread favor in both scientific and technical circles. Field-marshall von Moltke, as president of the Prussian Directorate of Surveys, took the matter in hand and formed a commission of specialists, which, after

thorough debate, made a series of recommendations to the Prussian Government. As a result, it was determined to construct in the building of the new Polytechnic School at Charlottenburg, proper rooms for an institution for the furtherance of "Präcisionstechnik." The teaching of experience that the development of new branches of industry is always closely connected with pure scientific conquests, often where least expected, led Dr. Werner von Siemens to propose an extension of the plan of a Physico-Mechanical Institute by the addition of a purely scientific department, and in order to assure the speedy establishment of a Physico-Technical Institute he generously offered the State a sum of 500,000 marks. A further impulse was given by the daily increasing development of the applications of electricity, which had already accelerated the international determination and definition of electrical units and standards for practical and scientific use. This caused an undeniable necessily for an official control of electrical measuring instruments, as well as a continual scientific cooperation in their construction and perfectionment.

Such causes led to the consideration of the matter not only by Prussia, but by the United Governments of Germany, and the result of the mature deliberations of statesmen and scientists was the proposal for the foundation in 1887, of an Imperial Physico-Technical Institute, (*Physikalisch-technische Reichsanstalt*) in which both technical and scientific research are to be cultivated and mutually promoted, and the constructive arts aided by investigations on materials, and by tests of methods and instruments of measurement. The Reichstag approved the project and granted the necessary money, and the services as director were secured of the greatest of living scientists, Hermann von Helmholtz.

The Reichsanstalt consists of two departments, the first or physical section, and the second or technical section, the duties of which are, to quote from the program of the institution:—

Section I.

1. The performance of physical investigations and measurements which tend pre-eminently to the solution of physical problems of great scope and importance in a theoretical or practical direction, and which demand a greater outlay in instrumental equipment, consumption of material, or time of observers and computers, than can as a rule be offered by private individuals or educational institutions.

2. The solution of matters from the domain of Section II,

as far as the equipment of the latter may be insufficient for their accomplishment.

The duties of SECTION II are:

1. The execution of such physical or physico-technical investigations as are directed by the official authorities, or are designed to further precise machine-construction, or where possible, other branches of German industry.

In particular enter into consideration:

a. Investigations on properties of materials.

b. Fixing of methods for the preparation of materials.

c. Experiments on the most suitable design and methods for the construction of physical and technical measuring instruments.

2. Verification of measuring-apparatus and instruments of control, as far as they do not lie in the domain of weights and measures; determination of the errors of graduation of such instruments and issuance of certificates as to the result.

3. Construction of instruments and parts of instruments, as well as the execution of other mechanical work for the needs of the Reichsanstalt itself, or for German state institutions and authorities, in so far as their procuring from domestic private workshops gives rise to difficulties.

4. In special cases the construction of parts of instruments for Germans engaged in business, in so far as the construction in private shops necessitates extraordinary means.

In cases 3 and 4, in estimating the price to be charged, the cost of materials and twice the time expended on the mechanical work are to be reckoned.

It will be seen that the provisions of the Sections 1 c, and of 3 and 4, may become of great practical advantage, and would be of great weight in America. By far the greater part of the instruments of precision used in the laboratories of this country are imported from abroad, for the reason that our constructors have, with a few notable exceptions, neither the experience nor the scientific knowledge to design proper forms. No amount of protective duties will succeed in building up such an industry as this, until the necessary knowledge is forthcoming on the part of the constructors. A duty of sixty per cent. upon optical glasses has not resulted in producing any American microscopes that will compete with the remarkable apochromatic objectives of Zeiss of Jena. On the other hand, Alvan Clark & Sons of Cambridge, have constructed telescope lenses, and Brashear of Allegheny constructs optical glasses and spectroscope-gratings (to be ruled upon Professor Rowland's engine in Baltimore) which are

without rivals in the world, because here thorough study and dearly bought experience of years have preceded success. Brains, not tariff's, brought about these results.

All physicists know by experience that an instrument can be designed by no one so well as by him who is to use it. Again and again, instruments are delivered, even by old and reputable makers, which are clumsy or poorly designed, simply because old models have been adhered to when a little advice given by those in the habit of using the instruments would result in a great improvement. It is easy to see, accordingly, how a laboratory constructing apparatus under the supervision of its trained professors must develop greatly improved forms of instruments, which could be directly utilized as models by our instrument-makers. An example will suffice. No self-registering magnetic instruments are constructed in this country, and when the government magnetic observatory was recently established in Washington, English instruments of the Kew pattern were introduced, the same form having been retained for years. The suggestion made years ago by Sir William Thomson, that the magnets in such instruments should be made very much lighter than is usual, has never been carried out, and if we had had a laboratory of our own, experimentation would probably have soon developed improvements in the design of the instruments.

The government of the Reichsanstalt is vested in a Curatorial Board, consisting of twenty or thirty of the most distinguished physicists in Germany (the president of the institution being ex-officio a member) who meet yearly and serve without pay except when traveling on business of the institute.

The staff of the institute consisted, at the end of 1890, besides the president and the director of the second section, of seven members, seven assistants, seven scientific and technical employés, four technical helpers, ten machinists, engineers and manual laborers of various kinds. The bureau consists of four secretaries and clerks and the necessary subordinates. In all there are employed in the Reichsanstalt forty-nine officials and other persons. Several of the members had been associated with the International Bureau of Weights and Measures, and the assistants are young men who have recently made their Doctor's degrees at the universities. Provision is made for the reception of volunteers, and for the invitation of distinguished physicists to make use of the laboratory in important researches.

The second section still occupies rooms in the great building of the Polytechnic School in Charlottenburg, a suburb lying just beyond the Thiergarten, (Berlin's great park), and in the spring of 1890, at the time of a visit by the writer, the first

section was also housed there, the new laboratory not being then completed. In September of last year a visit was made to the new laboratory, now completed, but as yet but partially equipped. Enough was however visible to give a good idea of the scale upon which the work was laid out.

The buildings stand in spacious and handsomely laid out grounds, back from a side street about a quarter of a mile from the Polytechnic, in a region perhaps as free from vibration as would be easy to obtain near a large city. In the middle stands the laboratory building, a large imposing square structure of yellow brick, while at the left of the grounds is the handsome residence of the president, and at the right a building for the resident staff. In the rear is the engine and machinery building. In the neighborhood of a million marks was spent upon the construction of the laboratory, and the buildings were erected under the superintendence of a commission composed of architects, machinists, astronomers and physicists, so that the result has proved in the highest degree satisfactory.

In order to preclude vibration and electro-magnetic, thermal or chemical influences from disturbing observations, not only all engines and dynamo-machines, but also the boilers for heating were placed in a machine-house sixty meters distant from the laboratory, where are also located ice-machines, a large refrigerating-room for experiments at low temperatures, and a chemical laboratory. The electrical arrangements are admirable. Three large batteries of storage cells are placed in a room under one corner of the machine-house, of which one battery serves for the electric lighting of the laboratory and machine-house, a second for purposes of physical measurement, and a third exclusively for photometric investigation. Concentric cables lead underground to the laboratory, and very complete switch-boards in the machine-house allow any wished-for distribution of current.

The laboratory has three stories besides the cellar. To insure steadiness a large plate of *béton* two meters in thickness was cast, covering the whole area of the building, and upon this the walls were built. This forms the bottom of the heavily vaulted cellar, the object of which is to screen off disturbances from the ground, especially moisture. To this end a continuous ventilation is secured, bringing the air from the rooms above down to the cellar, and sucking it up through large shafts at the corners of the building reaching above the roof. In this way the temperature of the rooms above is rendered more nearly constant. The walls of the ground story are double, with a ventilating air space of forty centimeters

between, so that this story is remarkably well protected from changes of temperature.

In the middle of the laboratory lie one above another, three large observing-rooms, each of seventy square meters floor space. They are lighted from above by daylight, glass being inserted in the floors, and in addition by electric light. Being entirely surrounded by other rooms of the same temperature they possess the advantage of constancy of temperature as well as dryness and light. The lower of these rooms is to contain balances and comparators for the comparison of measures of length.

A corridor runs on three sides of these central rooms, and outside this are a number of smaller rooms lighted by windows. On the basement floor are rooms for investigations on thermometers and barometers. Extensive arrangements are made for keeping large quantities of water heated to a constant temperature, governed by means of electrical thermostats, and by means of electric motors a continuous circulation is maintained through the vessels in which thermometers of precision are compared with each other. Temperatures can now be measured to an accuracy of a thousandth of a degree, and to give an idea of the accuracy of theomometry as now practiced, it may be mentioned that arrangements are used by which thermometers are read both standing vertically and lying horizontally, the elastic yielding of the glass bulb under the pressure of the mercury column in the vertical position being enough to cause a perceptible lowering of the reading.

On the first floor are the director's offices, and among others the electrical rooms, from which iron has been carefully excluded. Here careful normal standards of the unit of resistance have been constructed, and an instrument for measuring current strength in absolute measure is being experimented with. In another room researches upon the magnetic properties of various steels have been carried out.

On the second floor are the optical laboratories. Here researches on photometry are being carried out, in conjunction with Section II. Already greatly improved photometers have been invented, permitting the intensity of two sources of light to be compared with an accuracy seven times as great as was before possible. At present experiments are being made upon the value of the electric glow-lamp as a standard of light, the arrangements for measuring and maintaining constant the electrical energy supplied being very complete. Comparisons have been made with other proposed standards of light, such as the old standard candle, and the light from electrically heated platinum foil.

The first section, as has been stated, has but recently

moved into its new laboratory, and many of its rooms are as yet without the apparatus that they are eventually to have. The activity of the second section, in its provisional rooms, has been very great, and the erection of a separate laboratory is contemplated. Space will not permit more than an enumeration of the chief subjects in its sphere of activity. These are divided into six groups: 1. Measurements pertaining to heat and pressure. 2. Electrical measurements. 3. Optical measurements. 4. Mechanical investigations of precision, and such as embrace tests of materials for construction of fine machinery. 5. Shopwork. 6. Chemical researches. In the fourth group is included the testing of tuning forks.

Among the most completely organized tests have been those of thermometers, particulary for physicians. The demand for such certified thermometers has been so great that a branch station has been established in Ilmenau in Thuringia, in the midst of the glass industry, which during the first year of its existence issued certificates for over twenty thousand thermometers. In consequence of the establishment of this testing station the exportation of German thermometers to other countries has more than trebled since 1885.

Besides thermometers, mercury and aneroid barometers, and pressure-gauges for steam boilers have been tested. The electrical sub-section has been especially active. In addition to the examination of alloys suitable for the manufacture of wire for electrical instruments, it has tested commercial gauges for current strength and electrical pressure, and consumers' meters, and has shown the defects of present constructions, so that great improvements may be soon expected. Batteries and storage cells have also been tested.

Besides the optical work already mentioned, commercial electric arc and glow-lamps have been tested. Optical glasses, lenses, prisms, and telescopes have been examined.

The question of the pitch of tuning-forks is an important one, bearing upon the tuning of instruments according to a normal pitch. Experiments have been made on methods of determining the number of vibrations per second of tuning-forks, with the result that a standard fork has been made whose vibration number is correct to an accuracy of one part in fifty thousand. With this have been already compared some eight hundred forks which have been sent in by musicians.

The introduction of a uniform system of screw-threads for fine mechanism has been an often attempted problem, aiming to make possible interchangeability of parts and the alteration or repair of machines constructed in one shop, in others in different places or countries. This subject has occupied the

section for a year and a half, and much valuable progress has been made. Researches on the tempering of steel, and on the separation of platinum and zinc from other impurities have been further items in the work.

Such is a brief and imperfect description of what Germany has lately done for physical research. In England the need of a similar institution was mooted by Professor Oliver J. Lodge, in his presidential address to the physicial section of the British Association last summer. The London Board of Trade has already opened an electrical standardizing laboratory. France has for a hundred years had its Conservatoire des Arts et Métiers, and an electrical testing laboratory was opened in Paris several years ago. Switzerland has spent a million francs upon the new physical laboratory of her Polytechnic School in Zürich. Shall America be left behind? How long must we import our scientific instruments from Europe? If, as General Miles lately proposed, our National Guard shall mobilize at the World's Fair, shall every band have its instrument tuned differently or shall each band-master be supplied with a French tuning-fork? If we must imitate Europe let it be in attempts to cultivate art and science. Why should we have an imitation of the Eiffel Tower if it is to show nothing more than increased height? If America must lead in bigness, let it be to some purpose. If Germany, groaning under the weight of her standing army, can do what she does for science, shall we be content to look on and admire, or shall we nót rather be spurred on to emulation?

FATIGUE.

By F. B. Dresslar.

A feeling of fatigue is a warning, and, in the normal person, is always given in time. It indicates a disturbed equilibrium in the machinery of life. It is a call for help to keep up with demands. It is a levy on the reserve forces. For a short study of fatigue, the following outline will serve: (1) conditions which influence normal endurance; (2) normal curve for muscular fatigue; (3) brain-fag or mental exhaustion.

I. Fatigue arises from exertion, either mental or physical. It varies with the condition of the mind and body; for example, we tire sooner when the work is distasteful, or when the organs are unhealthy; we weary a limb quicker when the mind is tired and vice versa. We tire more readily at some seasons than at others; also the condition of the atmosphere, and likewise the time of day, affect the normal power of endurance. Maggiora and others have shown that more can be accomplished without fatigue when the work is properly adjusted. That is to say, that for each muscle, as well as for each mind, there is a given load with which the maximal amount of work can be obtained. The amount of work also varies with the intervening rests. Loss of sleep or fasting shows a marked change in the amount of the work produced. Alcohol temporarily increases it, while tobacco diminishes it, as Dr. Lombard[1] has shown. Lombard[2] and Mosso[3] have shown that normal muscular fatigue is partly due to fatigue of the muscles themselves, and partly to fatigue of the nervous centres. Lombard[4] found that if, when fatigue had brought the curve down, he kept trying to raise a weight, that suddenly the muscle acted again and went through a periodic regaining of its power. This he showed to result from periodic gain and loss at the centres, for no such periodicity appeared with electrical stimulation.

The effect of anæmia on normal endurance is quite marked.

[1] Voluntary Contractions, Jour. Phys., Feb., 1892.
[2] Muscular Contractions, Am. Jour. Psych., Vol. III, No. 1.
[3] Archiv. f. Anat. u. Physiol., 1890. p. 89.
[4] Op. cit.

Ludwig and Schmidt[1] found that less stimulus is needed for a given contraction in the muscles of well-fed animals than in poorly fed anæmic ones. They also showed that oxygen was the necessary thing in the blood that had to do with immediate relief of fatigue. The acid that Du Bois Reymond found to be developed in muscles during work is thought to be the cause of the increase in irritability noticed in the early stages of fatigue or anæmia. By some experiments, the results of which have not yet been published, the writer has found that voluntary control over the muscles of the forearm is much weakened, for rapidity of movement, by a brisk walk, though the arm be passive during the walk.

Rapid growth diminishes endurance. A child, which has grown up too quickly, easily tires. This fact, taken with the other, viz.: that there are periods of maximal growth in children, becomes of great pedagogical importance. One writer says, "If such children are overworked, they develop the irritable heart."

II. The curve of muscular fatigue probably differs for each individual, and is influenced by many internal and external conditions. Kronecker[2], by experiments on frogs' muscles, found the decline, due to fatigue, to be regular; i. e., the curve of fatigue is a straight line. Others have found the curve of fatigue in men to be convex toward the abscissa. From the shape of these curves, it can be determined whether fatigue causes a regular decline of power or whether the decline is irregular or periodic.

Mosso[3] studied with Maggiora the effect of mental fatigue on the muscular power, and found that a fatiguing examination lessened the muscular power. Mosso concludes that as we know of no way by which the fatigue of the nervous centres can influence the muscles through the nerves, that the effect was probably produced through the blood. Lack of nutrition was not the cause, for food only partially restored the lost power. The power was restored only after a long rest or sleep. It seemed to Mosso that the chief source of fatigue was caused by the collection of poisonous materials in the blood. This seemed the more likely, because of the result of experiments on dogs. In these, it was found, that during muscular work a poisonous material collected in the blood. When the blood of a fatigued dog was injected into a fresh dog, it produced in him all the signs of fatigue, but when blood from a fresh dog was injected, no such symptoms were seen.

[1] Ber. de Sächs. Acad., 1868. p. 12.
[2] Monatsber. d. Ber. Acad., 1870. p. 629.
[3] Ueber d. Gesetze d. Ermüdung, Archiv. f. Physiol., Heft. 1 and 2, 1890. p. 129.

III. Mental symptoms in normal fatigue as noted by Dr. Cowles[1] include loss of power of memory; sense-perception less acute; association centres less spontaneous, and hence slower; the vocabulary diminishes; lowering of the emotional tone; the attention unstable and flickering. Renewed power comes after rest and sleep. But "when the process of restoration is continuously incomplete" pathological fatigue or neurasthenia is the result; then a sense of effort attends the beginning of any labor. The higher centres show fatigue before either nerves or muscles, and if the exhaustion is not excessive, regains more quickly than either. Galton[2] resumès 116 replies to questions put to an English Teachers' Association thus:

Mental fatigue causes:

(1) Temporary fits of color-blindness.

(2) The loss of memory for common things.

(3) Slowing reaction time.

He suggests as tests for school children the following:

(a) The length of time one can work carefully at a long piece of work.

(b) The promptness and certainty of memory for common things.

(c) Arithmetical problems demanding "common sense."

(d) The reaction from hand to hand employed with a class.

He gets from these answers two conclusions:

(1) The reason mental fatigue is more wearing than bodily, is due to the fact that it interferes with sleep.

(2) Those most likely to overwork are those who work alone.

One of the early effects of fatigue shows itself in the difficulty of fixing and holding the attention. The condition of strain brought upon the will in compelling attention makes the work irksome. There arises in the mind thus taxed, a conflict between what it feels ought to be done, and preference for something else, resulting in worthless expenditure of energy and waste of time. The feeling of weariness predisposes to careless thought processes and slovenly habits of life. Fatigue renders the mind less sensitive to interest or novelty. The most attractive toys cease to interest the weary child, and instead of becoming a source of pleasure, actually annoy. The mind is active, but undirected and scattered. "One snatches at any and every passing pretext," says James, "no matter how trivial or external, to escape from the odiousness of the matter in hand." The "Stream of thought" must have within it sufficient force to go along of itself, else it will be broken up into counter currents by every passing sensation.

[1] Neurasthenia and its Mental Symptoms. p. 47.
[2] Journal Anthro. Institute, 1888. p. 157.

When normal fatigue gives place to "brain-fag", much more serious disturbances take place. Brain exhaustion is that condition of the brain in which the cells are no longer able to store up the necessary amount of energy. It is clear that the best conditions for brain nutrition are found only in natural sleep. The minimum amount of energy is then expended and there comes the best chance for a recharge of the battery as it were. Symptoms of brain-fag or mental exhaustion are, according to Beard,[1] impaired sleep; mind unpleasantly alert and determinedly following a train of ideas not desired; morning tire; sensation of falling from a height when dropping asleep; the mind worries over trivial things; some slight mishap not noticed during the day pervades the mind at night and drives away sleep; sometimes a feeling of loss of identity; (He cites a patient who suffered when he went into narrow dark places for fear he would be arrested and he could not make himself known.) inability to bear responsibility; (This has been noticed especially when a change is made from one business to another; many times such changes have destroyed all usefulness.) sudden collapse of the mental faculties; a temporary cloud obscures the mind; (Lecturers have sometimes found themselves suddenly unable to continue rationally.) defective and uncertain will; lack of power to inhibit, which is one of the most dangerous in its far-reaching results on the moral life; ("Perfect inhibition is the sign of perfect health.") a long list of morbid fears is often developed; also sudden bursts of anger; a feeling that all things augur ill; a pessimistic view of things; morbid introspection; exaggeration of slight illness; memory poor, especially for recent events; sleep, troubled with dreams, may also be added.

According to Beard,[2] Mills,[3] and many others neurasthenia, as a result of extreme mental activity, overstrain, and excitement must be regarded as an American disease. "Mental work *per se*," says Mills, "does not shorten life as shown by the longevity of those engaged in mental pursuits." Beard found that the average age obtained by 500 of the greatest men of history to be 64.2 years, while the average for all classes was but 50 years.

The age is demanding rapid education; in the hurry to go through college and the university, young men and women are sacrificing that for which they seek: power to think and do. But the most criminal results are coming from the over-pressure in the town and city schools. Superintendents, teachers and parents push and crowd; the year's work is long and hard,

[1] Neurasthenia.
[2] Op. cit.
[3] Mental Over-work and Premature Disease Among Public Men. Smithsonian Inst. No. IX of Toner Lectures.

but all are expected to do it; health is sacrificed for promotion; the joyous life of children is burdened with unnatural demands, until mental spontaneity sinks to a low ebb.

What is learned is soon lost; habits of uninterested study are formed; vital force is required faster than it is generated; work to-day is done on to-morrow's credit and thus the system is wholly at a loss to protect itself against disease or accident. It has been said that all diseases have their genesis in fatigue. Continued over-pressure in childhood means weakened possibilities in adult life. "All work and no play" not only "makes Jack a dull boy," but is likely to seriously blunt him as a man. The sacrifice of power in adult life, for precocity in childhood is not the only result; chronic fatigue is the basis of morbid conscious life, and so introduces an ethical question of great importance. The general tone of our conscious life depends largely on somatic feelings; in complete health the mind is scarcely conscious of bodily existence. Indeed some philosophers have gone so far as to hold that consciousness is a disease, brought on by fatigue; that just as healthy men are unconscious of the existence of their pancreas or liver, so are they unconscious of their own personality when body and mind are both sound. Let disease affect either, and there is constantly present some substratum of feeling independent of the attention, and this persistent substratum is the back-ground which gives coloring and setting to all reflections and interpretations. Whatever filters through the mind of such an individual, must, of necessity, receive thereby a coloring. Our thoughts, our actions and our plans are conditioned by our moods, and these largely depend on our bodily feeling. What has been called "logical dissatisfaction" comes to the weary mind when the association centres are dull and slow. "Mental depression," says Chapman,[1] "is a form of hyper-æsthesia, a sort of generally diffused excess of feeling."

In addition to what has been said on fatigue, it should be remembered that relaxation is an active process. A muscle, which has been subjected to fatiguing contractions, requires time to regain its normal relaxation after the stimulus has been withdrawn;[2] but occasional stimulations hasten relaxation. This, likewise, holds for mental tension; when mental relaxation is slow, we know that the centres involved have been over-burdened and cramped, and that some activity is needed to hasten relaxation. Those who stand first in the treatment of neurasthenia and kindred ills to-day are striving to find and establish a science of resting.

[1] Neuralgia and Kindred Diseases of the Nervous System. p. 174.

[2] Vide Von Frey, Ueber Zusammengesetzte Muskelzuckungen. Arch. f. Anat. u. Phys., Leipzig. p. 213.

THE INDIVIDUALITY OF NUMERALS.

By Margaret C. Whiting.

President Jordan's recent very interesting paper on the color of words in which he makes "confession" of the curious fancies of his childhood, has inspired in me a wish to reveal my own early experiences with the arithmetical tables of addition and multiplication.

For a long time a rough draft of the subjoined account, as literally accurate as I could make it, has been lying in my portfolio; but a fear that it would seem incredible to the general reader has withheld me from offering it to the public. For the same reason I have seldom spoken of it, and perhaps have thus lost opportunities of comparing notes with others and have never met with a similar form of youthful belief. To this day I have kept, unchanged, my first opinion of the numerals, which (I had almost said *whom!*) I judged as individuals, and never as abstract symbols. I began to hold these notions at about eight years of age, when arithmetic first became known as a study. Belief in them was held without question, for at least four years, during which time they made the study as enchanting as a fairy-tale, to a mind that has since been ill-disposed toward mathematical exercises. I am not sure when the non-substantiality of these ideas was brought home to me—when it flashed upon my consciousness that they were not recognized by people in general but belonged to me as an individual. I first told them, I remember, when I was fifteen, and even then with a half belief in them. It may be added that the writer's method of study was as unconventional as is possible to a child who learns its lessons as it chooses, and who "recites" at home.

I will begin by giving a descriptive list of the characters employed in the combinations:

1, 2, and 3, were children. 4 was a woman, a good self-sacrificing woman, who always reminded me of Edna Kenderdine in "A Woman's Kingdom." (It is by means of this comparison that I fix the date of the beginning of the beliefs; that being one of the few novels my reading had included at the age of eight).

5 was a mischievous feckless young scamp, with animal spirits, a capacity for getting into scrapes, and luck in getting out of them.

6 was a prince, amiable and possessed of very good manners, easily cheated by impostors, weak and dependant.

7 was an arrant rogue, full of schemes for his own advantage, without regard to others. (A character so unscrupulous that I always considered him bad for general society).

8 was a lady, high-born and haughty, gracious to the unfortunate, severe to all offenders, a musician, and in all ways accomplished; by far the most distinguished of the company.

9 was reckless but generous, always helpful to others, always disregardful of self. A noble but (what I considered) irritating benevolence ruled his acts. He was very tall and walked so carelessly that he often stubbed his toe.

10 was a great lord, cold and formal. He took the places assigned him as his right, was too elevated in station to help or hinder the other people.

11 was the herald of the King. He ran before 12 and prepared the way for royalty. He was very clever, and was always busy.

12 was the King. He was merely a majestic figure-head; and noticed only those who had climbed near the throne.

It will be noticed that my list of numerals included 11 and 12. I do not know why these were added, but it would seem because of the picturesque qualities their combinations contributed to the little drama they played together. The earlier combinations were too easily grasped to be important; the first move of interest was caused by 5 when he coaxed an innocent child to help him run away from home. 5 runs till he reaches 10, but before he gets there he stops to help 6. 5 can not put 6 into 12 where he wanted to go, and so drops him next door in 12. Though good natured, 5 is easily moved by wickedness and so is persuaded by the designing 7 to help him, instead of 6, into 12. At this, 8 is so angry that she thrusts thoughtless 5 into 13. Here he stays till kind 9 rescues him and puts him into 14. 2 helps 6 into twelve, but he cannot stay, for 7 is already there and the place is not large enough to hold both. 7 is stronger than 6, and so succeeds in putting the unfortunate prince into 13, which is a mild prison. 8, bent on justice, finds 6, who is crying, but doing nothing to get into a better place; she puts him into 14, which is very pleasant but beneath 6's dignity. 7 is already in 14 by the aid of 2. 8 turns out 7, and hurls him into 15, which was a dungeon. (The word "hurl" I always used to express the scorn with which 7 was righteously treated by 8). In this dungeon 5 had already got himself by the unintended moves of 3. With his usual

luck he persuades 4 to pity and transfer him to 20, which is a most desirable station. Then 8 takes her place in 16 tranquilly and welcomes 9 to her side in 17, whence he takes his own place 18. Here 9 finds 6, from which 4 leads him to 24. 24 is a luxurious spot fitted to 6's disposition; if he could only have stayed in it! Here he is able to show hospitality to 8, though a little disturbed by their noisy neighbor 5, who has reached 25 by his own efforts. 6 and 8 receive 12, who has made the first stage of his journey through his Kingdom, and is now resting before going on to 36. 12 must always wait a good while—it is no easy thing for 11 to get everything prepared for the King. Naughty 5, never content, teases 6 to help him on his way into 30. 6 would not dislike 30 though it is not a very agreeable place, if it were not for 7. 7 has made a great effort to reach 21 (by the help of 3, the child), and then, by means of 4, mounts to 28 in precedence of 9, who, however does not feel dissatisfied with 27. 9 is never anxious for himself. 6 annoyed by the near neighborhood of 7, makes a huge endeavor and goes himself to 36. 7 sees him go, and eggs on 5 to go with him to 35; once there, he persecutes 6 until, through fear, he goes with his enemy to 42. Here 6 languishes, in the true fairy-prince style, till 8 looks down from her hillside 32, and sees him. (There is a valley between 30 and 40, and 4 and 8 went to 32 to see the view). 8 swoops down on 5 and punishes him by putting him in 40, which is outside the gates of 48, the home of 8. Into 48 she takes poor 6, and feeds him, and plays to him wonderfully upon the piano. 7 in rage and despair creeps to 49, and listens to 8's music as he lies hidden behind the house in the dark. 8 discovers 7 in his retreat and pushes him over into 56, out of the sight at last of poor 6. Then she tenderly places 6 in the hands of 9. 9 had seen the tragedy of 6 and 7 from afar, and with the help of gentle 4 had rushed to 36. He was too late, 12 was on the way, and so 9 hurried on. He thought 5 had been punished long enough, and therefore took him to 45, where, after a scolding, he left him. From thence he willingly hastened to place 6 in 54. Meanwhile lordly 10, untroubled, has pursued his path. He finds in 5, whose mischief is broken, a glad reward, and they go together to 50. 5 was thoroughly frightened at the result of his recklessness on 6, and from this time he makes himself small, and is very useful to 11 and 12. Philanthropic 9 gives 7 one more chance to reform, and offers him an asylum at 63. Here 8, pausing at 64, looks back, and for the last time sees 7, ere she takes 9's escort to 72. 7 justifies 9's belief in his repentance, for he causes no more trouble; though, after 10 puts him on his feet in 70, he makes trouble in helping 11 get ready for 12.

After this dramatic episode between 5, 6, and 7, had come to a conclusion, my vivid interest in the combinations subsided. I no longer followed them with bated breath, though I faithfully carried out the fortunes of the rest up to the end of the 12 times 12 table, and I cared a great deal about the fate of 9, who was the first of the company to outlast the figure 100. I was always glad too, that he ended in the even number 108.

On mature reflection I find that there must have been a slight and unconscious process of reasoning that produced some of these notions. For instance, my idea of 7 (I still despise 7) seems to have been due to the fact that it is always an inharmonious number, frequently uneven. 9 is given the quality of lacking self-interest, because at every move it loses in the count, as 18, 27, 36, 45, etc. 6 is too even in combination to possess interest independent of situation. (I always thought of him after his final rescue by 9, as carrying his head on one side, and complaining of his hardships—8 had spoiled him by excessive indulgence!) 5 is an erratic number that moves rapidly, alternating its jumps from even to odd numbers. 8 moves in even combinations at long intervals that suggest dignity. Except for the idea that 9 was tall, I had no mental image of the look or manner of any of the numerals; nor did I liken them to real or book characters, save in the case of 4, and a slight comparison I drew between the unworldliness of 9 and an elderly relative of similar nature—he was also a tall man, but I do not think he was remarkable for stubbing his toes.

It will be noted that addition plays a small part in the beginning of the drama. I have been careful to write down the only combination produced by its means. Why used at all, and why abandoned, I know not.

As to theories to be deduced from these notions, I have none; nor am I scientific enough to know whether or not they might be deduced. I can only report these true memories that are more clear to-day to my mind than the faces of my early playmates; to me they seem the mental divigations of a child who tried very successfully to make entertainment for itself from the irksome and otherwise distasteful study of arithmetic. Candor also compels me to state that the only mathematical combinations that now return naturally to mind in a moment of need, are these that figure thus fantastically adorned by vain imaginings.

EDUCATION AS A SCIENCE.

E. W. SCRIPTURE, Ph. D. (Leipzig).

Didactic sciences are of two kinds—perhaps we should say, have two divisions: the sciences of the general principles or of the ends to be obtained and the sciences of the ways to conform to those principles, to reach those ends. The sciences concerned with education would accordingly be divided into the general science of education, or, departing somewhat from the ancient meaning of the name but approaching to that of the present day, we may call it the science of pedagogy, and the special science of education or the science of didactics. The former determines the purposes of education, the latter the means of reaching the ends proposed. The one is often called the philosophy of education, the other has been well developed in Germany under the name of *Didaktik*.

The starting point of any advance in the sciences of education is to be found in the possibility of developing the science of didactics. The educators have long been waiting for psychology to furnish them with data on the mind of the child, but for the psychologist that is a subordinate subject, and even when he undertakes it he starts from an entirely different point of view, passing over as unimportant many things that are of vital interest to the educator. Psychology seeks to determine the course of mental phenomena, general didactics desires to know the influence of certain arbitrary modifications of these phenomena; the psychologist makes it his supreme effort to keep the conditions of his experiments as nearly as possible the same as those of ordinary life, the educator is above all interested in certain artificial conditions. Take, for example, the association of ideas. A psychologist experiments to determine the laws governing the association under the ordinary circumstances; one law is as important for him as another. The educator, however, sets himself these problems: which of these laws can I make use of in teaching? and how must I proceed to obtain a given effect in a certain case? These are, of course, matters of no moment to the psychologist, and as long as the science of didactics

waits for psychology to solve its problems, it will make as little progress as it has done in the past. Right here lies the possibility of a new development in the science of education. In the last ten years psychology has been completely transformed by the introduction of experimental methods and laboratory work. And now the way lies clear for the transformation of the present science of general didactics from a collection of rough guesses and crude observations into an experimental science. Let me give an illustration of how this can be done. Last year I made a long series of experiments on the course of ideas; my purpose was to find out how our ideas actually followed one another. As a psychologist that was the whole of my problem, but what was more natural than at the end of the investigation to ask the question: what can I do toward making the ideas follow one another in any way I please? Suppose that a number of foreign words are to be associated with a number of English words; it is not enough for the educator to know how this is usually done, he must know how to learn to do it in the shortest time and with the least effort. With this in view I made a few experiments, not with the idea of obtaining any definite results, but merely to try if there might not be a way of "experimental education." On each of eight cards I pasted a picture and a Japanese word in ordinary Roman letters, on eight more I put a German word (the experiments were made in Leipzig) and a Japanese word. These were shown successively several times to another person. Two days afterward half of each card was shown him and he was to tell what was on the other half; e. g. he saw a picture and had to give the Japanese word belonging to it. The results, for which I do not in the least claim scientific accuracy, can be arranged as follows: when the picture was shown alone and the word demanded, the correct answer was given three times out of eight; when the German word was shown, not a single time could the Japanese word be given; when the Japanese word was shown and the picture demanded, it was correctly given in every case but one, whereas the Japanese word was able to call up a German word only three times out of eight. Now suppose that this series of experiments instead of being limited to a single occasion had been extended till the results could claim the authority of numbers, then we could lay down the law that in teaching the vocabularies of foreign languages more than three times as rapid progress can be made by learning from pictures as from merely placing the words side by side. That is what everybody would expect; but although we have Ollendorffs, Ahns, and a dozen more, no one has yet produced the reading-book of a foreign language in which the vocabu-

lary is taught by arranging the words beside little pictures. Nearly three hundred years ago (1892 is the third centennary of his birth) Comenius had an idea somewhat of this kind and it survives in our dictionaries and encyclopedias, but for school-books it has not borne its full fruit. Of course we cannot say that because Comenius thought so and so we ought to do so. But if a course of carefully conducted experiments in a laboratory of experimental didactics should prove that the vocabularies can be learned in a certain way in one-third the time now occupied, we would have a firm foundation for the demand that our children—and ourselves as well—be provided with text-books that fulfill the given conditions.

What is here merely outlined in respect to a single point can be extended to other problems. I have heard that a treatise on memory and the association of ideas is soon to appear in which the influence of the arrangement of words into dactylics, iambics, etc., is to be accurately shown in the ease with which they are memorized. The method is not confined to memory; by the same means we might determine the best way of teaching the individual to distinguish between colors, likewise we might find out how to teach him to draw a straight line or a symmetrical figure. Very readily the investigation could be carried into such problems as the quickest means of developing the sense of melody and harmony, of learning to write, of learning fractions, etc. The difference would be that in the end we would have something definite on which to base our statements in regard to education, whereas now we have nothing but antiquated traditions and careless observations as a foundation.

To carry out this idea every pedagogical seminary should have a laboratory in which, in the first place, the methods of experimental psychology are to be taught and then these methods are to be applied to educational problems. Every teacher should have been a psychologist and a physiologist before he becomes a pedagogue, and these two sciences cannot be acquired anywhere but in the laboratory. Likewise the student of education should work in the pedagogical laboratory, and that for two reasons: to learn by experience what has been already found out and to find out new facts.

There now arises the question of the general science of education. Up to the present time this has been unworthy the name of science; each writer puts forth a string of opinions without the foundation of fact, the most that is ever done being a few careless observations of children. As a consequence, we have almost as many views of education as there are writers. To invent a system of pedagogy is a very cheap way of obtaining notoriety. But what shall we say of the results?

The pedagogy of to-day is a collection of bitterly opposed sects, each of which believes that the salvation of the world hangs upon its own dogmas and that all other pedagogy is a delusion and a snare. Almost every conceivable opinion on each point can be found in some one of the "systems." And, as a result of this diction and contradiction, one teacher follows Herbart, another Beneke, another Lotze, another Bain, etc. etc. Anarchy reigns in the domain of general pedagogy, but the case ought not to be given up as hopeless; other sciences have been in just as bad condition and have yet undergone a rebirth.

Suppose, now, that we are at the end of a fifty years' development of experimental didactics and that we have as a result a mass of laws that tell us just what to do if we wish to develope, to repress or to modify in any way each of the activities of the mind and the body. Given a certain condition of mind or a certain facility of action to be attained, then we can tell how to attain it instead of guessing at it. Let us determine to bring up a certain child as a draughtsman; psychology tells just what are the requisites for such a vocation, the proper judgment of form by the eye, the ability to make the hand move in accordance with the eye, etc.; our science of experimental didactics puts into our hands the requisite information how to train the eye of the child in question to perform these duties, how to exercise it in order to neutralize its defects, how to bring about the proper co-ordination of hand and eye, and to suppress improper co-ordinations, etc. Or let us determine that for some reason or other the faculty of carefulness is to be cultivated. Our science should furnish us with the means of training this faculty and of removing by the sternest punishments, if necessary, all the careless instincts, just as a trainer shows the athlete how to best apply his powers and the surgeon cuts out a hindering tumor. Being able to answer such questions as these, we are ready for a science of pedagogy, of general education, which is to decide what are the ends to be striven for, which gives us rules for deciding what faculties are to be cultivated and what ones suppressed. Let us then determine carefully and hesitatingly, slowly, just what aims we should propose to ourselves in the education of our children. Whatever the answers may be, let them be obobtained by the careful study of existing conditions and needs, by the science of general pedagogy in connection with philosophy, sociology and political economy—working on the foundation of physiology, psychology and didactics.

A SKETCH OF OLD SCHOOL HOUSES.

By F. B. Dresslar.

The purpose of this paper is to give some idea of the "Early School-House" and by contrast, some notion of the development of the demands for better school-buildings. Very little data can be found, concerning school-houses, prior to the sixteeenth century. Occasional pictures and hints make it appear that where school-houses existed the pupils sat on benches without backs, or on stools around tables. A picture of the school-room in which the Emperor Maximillian I, received his training shows tables so cut out as to form something resembling modern desks; but only an occasional city was thus supplied. Vives, (1492-1540,) the Spanish educator, was far in advance of his time and the resources of his country, perhaps, when he said: "There should be chosen a healthful situation, so that the pupils may not one day have to take their flight, dispersed by the fear of an epidemic." "Firm health," he adds, "is necessary to those who heartily and profitably apply themselves to the sciences. And the place selected should be isolated from the crowd, and especially at a distance from occupations that are noisy, such as those of smiths, stone-masons, machinists, wheelwrights and weavers. However, I would not have the situation too cheerful and attractive, lest it might suggest to the scholars the taking of too frequent walks."[1]

In Scotland, as elsewhere, schools antedate school-houses. The first thing was to organize a school, the next to find a place for it. Thus in 1582[2] it was provided by the council of Kirkcaldy that if the minister's house was unable to contain all his scholars, a larger room should be found. The authorities of Kirkcudbright "in consequence of the state of the school-house," ordered, in 1690 that the "tolbooth" be used for school, and that "when prisoners shall be in the tolbooth it shall be more strictly kept." Some general notion of the condition of the Scottish school-houses of this time may be

[1] Cited by Campayrè, History of Pedagogy, p. 132.
[2] Grant's History of Burgh Schools of Scotland, p. 512 et seq.

gained from the following extracts from burgh records given by Grant.

"In 1584 the council of Edinburgh gave orders for repairing the glass windows, locks, bands, and dykes of the grammar school, and for furnishing the well with buckets and water-stands, and hanging the bell of the school. In 1623 the grammar school of Aberdeen, being 'ruinous and likely to fall,' the council ordained for the sake of the education of the youth and the credit of the town, that the school be 'biggit, beitet, repairit, joisted, lofted, and slated.' In 1677 the schoolmaster and doctor of Cupar petition the council to repair the school, because the cold winter is now at hand, and the school-house so defective that they—much less the young ones—cannot be sheltered from tempestuous wind, rain, and piercing cold." "The council of Wick, in 1751, resolve to build a house twenty feet in length, and 16 feet in breadth, with a fire-room fourteen feet in length, the side walls of the school-house and fire-room to be ten feet high; the whole house to be lofted and to have a chimney in each of the 'gavels above,' with a partition of slack and rye in the middle, and 'thak roof' over the whole." "In 1725 the council (of St. Andrews) being informed that the boys in the grammar school cannot sit for learning to 'wreatt, so that they are necessitate to wreatt upon the floor lying upon their bellies.'"

Grant also says, "children are still (1876) too often huddled together in unhealthy little rooms—stored away in back areas—packed like useless lumber into old holes, old stables, old granaries, old weaving shops, old cellars, old barns, old smithies, old byres, yea, there are those living who can tell of having gone to school in old steeples, and even in old tombs."

Joseph Furtenbach, the younger, described from memory a school-house which was consumed by fire in the town of Isny in 1631.[1] It was divided into two departments, each about 48 x 40 feet, and 10½ feet high, one for the boys and one for the girls. The pupils were seated on benches without backs, around tables; these tables, each 18 feet long, 3½ feet broad, 2½ feet high, extended out from the walls; each was marked off to accommodate 16 pupils; there were 4 tables on each side in each department. The windows were on the sides; two pillars in the central aisle of each department upheld the roof; near these pillars were small platforms upon which pupils stood while reciting or declaiming. Between the two rooms was the entrance hall, twelve feet wide, one end of which served for a sort of reception room. Each department was furnished with a black-board, a table for the small

[1] Zeitschrift f. Schulgesundheitspflege, Vol. I., p. 142.

children, upon which were blocks with red letters on them, another one for the teachers and for special work for the larger pupils; and in one corner 35 or 40 pins driven into the floor in rows and bearing on their tops plates, served the little ones as pedestals from which to recite. The windows were made to open in order to ventilate the room; each room contained a stove made of tiles. Attached was a comfortable house for the school-master.

In France, previous to 1789, the houses used for school purposes varied according to the chance to which each owed its origin. The rooms for instruction were generally small, neglected, insufficient and dirty.[1] At the time of the French Revolution, "school-houses," says Campayrè,[2] "were most frequently merely wretched huts, wooden cots, and narrow ground floors, badly lighted, which served at the same time as a domicile for the school-master and his family, and a class-room for pupils. Benches and tables were things rarely seen, and pupils wrote standing."

In our own country the district school was the chief source of instruction in the early days; and for this reason the remainder of this paper will be devoted to the "Old District School-houses," and chiefly to those of New England. The following description found in the records of the town of Sudbury, Mass., fits well the earliest type:

In 1702 the "town voted and paste into an act, to have a conveniant scool hous" and "that the school-house that shall be built by the town shall be set and erected as near the centre of the town, as may be conveniantly set upon the town's land, that it be twenty feet in length, eighteen feet in breadth seven feet from the bottom of the cell to the top of the plate, a large chimney to be within the house, the house to be a log house made of pine, only the cells to be of white oak, board and shingles to be covered with. Also the chimney to be of stone to the mortling and finished with brick. This was paste into an act and vote Jan. 15th 1701-2." In 1711 the town voted to have but one school-house and this was to be built at "ye gravel pitt." "Ye school house to be 20 foot long, 16 foot wide, six foot studd, nine foot and a half sparrl. Ye sills to be white oak, ye outside to be borded, and ye bords to be feather edged, ye inside to be birch and borded in ruff bords, lower and upper flower to be bord and a brick chemne, and two glass windows 18 Enches square per window, and the Ruffe to be borded and shingled." This building was to be complete by the last of May, 1712. "Joseph Parmeter

[1]Buisson, Dictionaire de Pedagogie, (Première Partie) p. 1776.
[2]History of Pedagogy, p. 367.

was to make it and have for pay fourteen pounds."[1] From the history of the town of Warren this note is taken:— "Town of Warren in 1745 voted to build a school-house 20x 17 feet, having a dutch chimny at each end."

From Rev. Warren Burton's famous book, "The District School as it was," published in 1850, I take the following description: It was erected as near the middle of the district as the surveyor's chain could determine. There was no wood-shed, nor out-house. The house was built half in the road and half in a field; it was never painted and had six windows. The windows were protected by board shutters. The building was covered with shingles. In front there was an entry filled with kindling. At the south end of the house and at the left as you enter was one seat and writing bench, making a right angle with the rest of the seats. This was occupied in the winter by two of the oldest males in the school. At the opposite end was the magisterial desk, raised upon a platform a foot from the floor. The fire-place was on the right, half way between the door of entrance and another door leading into a dark closet, where the girls put their outside garments and their dinner baskets. This also served as a fearful dungeon for the immuring of offenders. Directly opposite the fire-place was an aisle, three feet and a half wide, running up an inclined floor to the opposite side of the room. On each side of this were five or six long seats and writing benches, for the accommodation of the school at their studies. In front of these, next to the spelling floor, were low, narrow seats for a-b-c-darians and others near that rank. In general, the older the scholar, the further from the front was his location. The windows behind the back seat were so low that the traveler could generally catch the stealthy glance of curiosity as he passed. Such was the old school-house at the time I first entered it."

Horance Mann wrote in 1837 that "not one third part of the public school-houses in Massachusetts, would have been considered tenentable by any decent family out of the poor house or in it. As an incentive to neatness and decency children were sent to a house whose walls and floors were indeed painted, but they were painted all too thickly by smoke and filth; whose benches and doors were covered with carved work, but they were the gross and obscene carvings of impure hands; whose vestibule after the oriental fashion was converted into a veranda, but the metamorphosis which changed its architectural style, consisted in laying it bare of its outer covering. The modesty and chastity of the sexes, at their tenderest age,

[1] Quoted from Hudson's History of Sudbury.

was to be cultivated and cherished in places which oftentimes were as destitute of all suitable accommodations, as a camp or a caravan." In summing up he says: "The school-houses in the State (Mass.) have a few common characteristics: They are almost universally contracted in size, situated immediately on the road side, and without any proper means of ventilation. In other respects great diversity exists: some have horizontal floors, others amphitheater in style; some have single seats, in others ten or more pupils sit together; in some the seats are placed around a table, in others around the wall with their backs to the wall, others facing it. The form of the school-house is with very few exceptions square or oblong; but sometimes round with an open circular area in the center for the teacher's desk and stove; with seats and desks around the wall facing outwards, separated from each other by high partitions, which project some distance into the room, so the scholars may be turned into these separate compartments, as into so many separate stalls."

Ten years later school-houses were not ideal, as appears from the following extracts from town reports for 1846-47:— "In our district the school-house stands on a highway, with 80 pupils enrolled as in attendance, in a room nineteen and a half feet square, without any outbuildings of any kind." In another in the same town, the school house is less than seven feet high, and the narrow slab seats are twenty-one inches high (four inches higher than ordinary chairs). "In another district, the room is fourteen feet square, and six feet five inches high." Another superintendent says: "The houses and the internal arrangements are inconvenient; a slanting board the whole length of the house for a desk, and a slab board for a seat so high that the scholars cannot reach the floor with their feet, constitute the conveniences of half of the schools in this county."(1)

The following interesting letter concerning "Old School Houses," written by a teacher of "much experience and distinction," is taken from Barnard's famous book on School Houses [1850]: These are the antiquities of Connecticut, rude monuments of art, that must have had their origin coëval with the pyramids, and catacombs, for aught we have learned to the contrary, save by the uncertain information of tradition. "It always stood there" says the oldest inhabitant, when asked the date of the erection of one of them. Little brown structures of peculiar aspect, meek, demure, burrowing in some lone, damp and depressed spot, or perchance perched on the pinacle of a rock, as if too contemptible an object to occupy a choice piece of earth; exposed to the remorseless winds of winter, and the fervid rays of Sum-

mer; at one end a narrow and dingy entry, the floor covered with wood, chips, stones, hats, caps, odd mittens, old books, bonnets, shawls, cloaks, dirt, dinner baskets, old brooms, ashes, etc., all thrown together in the order as here catalogued; the principal room retaining its huge stone chimney, which for generations boasted its ghostly fire-place, affording a ready oblivion to annual piles of green and snow-soaked wood; the burnt, smoked, scratched and scrawled wainscoting; the battered and mutilated plastering, the patched windows, the crippled and ragged benches, the desks which have endured a short eternity of whittling, the masses of pulverized earth in constant agitation, filling the throats, eyes and nostrils of the inmates, the unmistakable compound of odors which come not from "Araby the blest," all point to the remote antiquity of these buildings, and intimate the veneration in which they are held. Such is the report of a teacher who had just visited and examined three-fourths of the school-houses of his county.

While New England furnished the type for the early district school-house in this country, the middle and western states have varied the type to suit their conditions, but chiefly in the use of material for construction; the general plan remaining the same. The following description of an Indiana school-house in the early days, furnished by a friend who received his early schooling in the house he describes, will show this variation: "The buildings was 18 x 24 feet and constructed of hewn poplar logs, which would probably face about 16 inches; the floor, which consisted of puncheons, was laid on white-oak sleepers and fastened there with their own weight; the rafters were made of split timbers and hewn to 5 x 7 inches; upon these, oak boards 4 feet long were laid for the roof, and held in place by the weight of long poles, one for each course of boards; the windows were made by cutting out, well up on the sides of the building, one of the logs, and fitting into this opening a rude frame or sash, and pasting over it greased paper. Into the log below this window, holes were bored at a slight angle, and into these holes wooden pegs, with a head or shoulder on their upper sides, were driven. Resting upon these pegs were slabs, with their splinters partly removed, while the smoothing and polishing was left to be the result of wear and tare; this was the writing desk, and here it was, with our goose-quill pens, we made our "pot hooks" and "hangers." The seats were made of timbers split in the center, and cut into desired lengths; the split sides were adzed smooth; into the lower side slanting holes, two inches in size, were bored and into these wooden pins were driven for legs. The door was made

of poplar slabs and fastened together with cross pieces, called battons, which were two inches shorter than the width of the door. These pieces were fastened to the slabs with wooden pins, and the whole thing was hung on wooden hinges, the music of which was occasionally softened by an application of soap. The latch consisted of a hickory spring, with a string of raw hide fastened to it and hanging out through a hole in the door, so our "latch string was always out." The fire-place must not be forgotten, for out of the cheery fire came not only warmth and light for gloomy days, but also the glowing, changing, flickering images of our youthful imagination found symbolic likeness there. At one end of the building the lower logs were cut in two, six feet from each corner, which thus made an opening of six feet in the center; here was built the chimney; the foundation and all that part of it below the stem was made of stones, mud and slabs, the stem was made of split sticks and wood. On the top of the chimney four large balls of mud were placed; whether these were symbols of the "lily work at the top," or merely weights to keep the stem from blowing off, may never be known; that they made an imposing appearance, none of us ever doubted. Into this huge fire-place great logs were rolled; with boulders for "dog-irons," it was then complete.

Hanging by the door on the inside was a board upon which was printed the word OUT on one side and IN on the other; when we went out we turned the board so as to read OUT; when we came in the board was turned to indicate this.

Such was the first school-house I entered and by no means an exaggeration of the type prevalent in central Indiana but half a century ago."

Numerous quotations could be made to show the ill condition of school houses at this period in New England and adjoining states. The following is a resumé of the typical features of the early district school-house.

The first step taken, was to employ a surveyor, to find the exact centre of the district. School grounds were scarcely thought of. The house was as often built on wet ground as otherwise, and generally as near to the road as it was possible to get it. Most of them were half in the road and half in a field, while many of the remaining were exactly in the road, and the traveler turned either to the right or left according as he was prompted to follow the last wheel-track, or was so bold as to break over precedent and shun a mudhole. The location of the school-house was determined by two things: the centre of the district, (which was the most important), and worthlessness of the land. The size of the lot need only be sufficient to contain the house. No well was to be

found about the school premises, and the water used for drinking was carried from the neighboring houses or from the nearest spring, the basin of which consisted of a hole dug out by hand, or a barrel sunk in the ground, into which the water flowed.

The roof was low and flat and covered with boards well turned up at the ends; these curves served the double purpose of catching the yarn ball when the smaller children played at "ante-over" and of furnishing a convenient rest for the bricks which had toppled from their place on the chimney or flue. It was not more than 12 feet from the comb to the level of the floor. As to size "exclusive of entry and closets, when they are furnished with these appendages, district school-houses," says Barnard, "are not usually larger than 24 x 30 feet on the ground and seven feet high." They were more frequently smaller than larger. "School-houses of these dimension" he continues, "were occupied by at least 45 scholars in winter, and not unfrequently by sixty or seventy, occasionally by more than a hundred.

The weather-boarding was generally without paint and made of the poorest lumber. The nails were starting out or had pulled through in a vain attempt to hold the rotting, warping boards in place. The small windows, perhaps averaging 30 x 40 inches, were often lessened by nailing boards across, to prevent looking out. Usually not more than three fourths of the space thus left for light was available, for broken panes made it necessary at times to paste on paper or substitute a board. There was usually six of these windows, two at either side and two at one end. The door was usually situated near one corner, and where an anteroom was allowed, opened directly into this, where could be found a pile of wood, broken desks, old brooms, broken and disabled benches, old books, and whatever else could be thus put aside. Here also were dinner baskets and wraps. But where this convenient catch-all was not found the corner of the school-room was made to serve these purposes. The walls inside were black and dingy; nothing about to gratify, much less to educate the aesthetic life of the children. The floor was made of rough soft lumber or split puncheons. The yawning cracks let in the cold wind, and let out the water when the roof leaked. The cracks in the floor, the opening beneath the door, the broken panes in the windows and the roaring fire in fire-place or stove furnished the only means of ventilation.

It does not seem strange that the stoves were cracked and warped, that their doors were devoid of hinges or latch, or that the pipe was thickly coated with red rust, when one

thinks of the ice-covered, water soaked wood which must be thrust into the stoves when hotest, to dry before the fire went out; thus at times they were "heating with steam and at others steaming with heat." There were no blackboards, charts, reference books or apparatus of any kind save the ever-present indispensable birch gad.

There were three methods for arranging the desks: in the first case they were placed in two tiers on three sides of the room so that the pupils would all face the center. Those sitting on the rear benches used the wall for a back rest, and the back of the next tier for desks. Each bench was long enough to accommodate six or eight pupils. In the next class the benches were placed across the room and fronted the teachers desk, with an aisle in the centre. In the third class the benches were placed around the room in such a way that the pupils could sit either with their faces toward the wall or the center of the room as they wished, or rather as the teacher wished; in either case exposed to whatever glare of light there might be. These benches were long and frequently joined to-gether around three sides of the room; they had no rest for the back and were of uniform height. Upon these the smaller children were suspended between earth and heaven, as if doing penance for some heinous crime. One writer aptly characterizes the condition of the pupils when he says: "they have to reverse the ordinary practice of standing up and sitting down; they literally *sit up* and *stand down*, their heads being higher when sitting than when standing." A strange arrangement when it was only necessary to shorten the wooden pegs that served as legs for these benches. The desks and walls were carved in a fantastic and hideous way. Pens for the wary fly which dared hazard its life within; obscene pictures and vulgar words but half erased or glaringly plain; figures as incoherent as boyish thoughts, all attested the fact that the school-house was held in light esteem by pupil, teacher, and parent.

Real interest in school architecture in this country began in 1829 when the *School Magazine* No. I, [being an appendix to the *Journal of Education*] published an article relating to school-houses. In 1831 the American Institute of Instruction offered a prize of $20 for the best essay on School-Houses. The prize was awarded to Dr. Wm. A. Alcott, of Hartford, Conn. This essay was published in the second annual volume of lectures before the Institute and was the beginning of the agitation on this subject, and was continued by the ardent Horace Mann, Hon. Henry Barnard and others. Since that time the growth in public opinion has not been greater than

the change of ideals. The essay spoken of above shows this: "The school-house" says Alcott "should stand on an elevated spot of firm soil. Shade trees and fruit trees if possible should be near. The whole should be enclosed with a wall which at the convenience of the instructor, should prevent any communication from without. The wood should be kept in a separate building thereby diminishing the danger from fire and the house can be kept more cleanly and airy. Nearly of equal importance should be a flower garden and a well or spring of good water, and facilities for washing. The ceiling should be arched, the walls plastered or white-washed, or *perhaps* painted. A building intended for 60 pupils should be 40 feet long and 30 feet wide; for 100 pupils 48 x 40 feet; for 50 pupils, 36 x 30 and for 36 pupils, 34 x 24. The seats should be single and placed in rows with an aisle 18 inches wide. The desks to be 2 feet long, 1¾ feet wide and seats about a foot square. No shelves or cavities are to be under them. Each seat is, in effect, a square box, closed on all sides. The height of the desks and seats is to be proportioned to the height of the pupils who occupy them. The edge of the desks will be directly over the edge of the seat. The desks are to be the same height as the elbow, when the arm hangs down. The desks should be flat, for the pupils in after life will have to use flat desks for writing. The school will face the instructor. The space between the outside row of desks and the wall will be two feet. The stove stands near the entrances. The windows should be elevated five feet above the floor." The reasons given for this last demand are: 1. It will then be difficult for the children to look out and thus will prevent the necessity of nailing boards across the windows, as is sometimes done to keep pupils from looking abroad. 2. The windows are thus rendered less liable to injury. 3. The pupils are thus less exposed to currents of air. 4. This position favors ventilation. 5. The light will thus not be so direct. 6. Room below the windows is thus left for charts, prints, and paintings.

While most things in this ideal are not objectionable the things which are today considered of most importance are not spoken of in detail. The heating, ventilation, the height and arrangement of desks, receive less thought from a hygienic standpoint, than these with other points receive from the fact that the pupils are to be governed. But it was a wise essay and has done a great deal of good. It was the beginning of a movement in this country contemporaneous with a like movement in Germany; it led to a study of the school-houses as they were and the public thus became aware of the horrible con-

dition of school buildings. By this means too, the real relation which ought to exist between a people and its system of schools, was made clearer and more imperative. It was one of the first victories for the common schools and state education. The advancement in school buildings and equipment since then, can best be realized perhaps, when it is seen that, with the single exception of the flower-garden, Alcott's ideal has been more then attained. But with this advancement have come new ideals and to attain these is the task of to-day.

LITERATURE.

I.—GENERAL.

Education et Instruction. Par OCT. GRÉARD. Paris 1887. 2 vols. pp. 342 and 301.

In July, 1880, M. Gréard wrote: "For ten years superior instruction and primary instruction have been the objects of marked favor; local councils have rivalled the public powers in zeal to create or develop these establishments to enrich the laboratories and modify the material of instruction, and a feeling of great confidence has been produced. Every commune has felt the renovating breath. Meanwhile secondary instruction has been neglected. To-day the reforms which classical studies demand are in their turn the object of inquiry, and the Parliament has just created a bureau of Lycées. In view of the promise of the future what is the present state of the Lycées of Paris?" In reply he states that they are insufficient in number and greatly overcrowded. There are classes in grammar, where it ought to be forbidden to admit more than thirty or thirty-five children, which now contain sixty. In a class of philosophy one hundred pupils are grouped to receive instruction in history or the sciences. In a class in rhetoric the professor can reach his desk only by stepping over the extra benches that stop the doorways. In an establishment where two hundred places are necessary for instruction in drawing there are scarcely fifty. At the end of the 18th century Paris had a population not greater than 600,000 souls, and ten colleges; since that time her area has more than doubled and her population has increased 75 in 100, yet one Lycée only has been added, that of Vanves. The framework of classical instruction remains, with this exception, such as it was under the first empire. A glance at a map of Paris shows that more than half the population is absolutely unprovided with great public establishments for classical instruction. M. Gréard then proposes the establishment of six new Lycées, and discusses the plans for them. Shall they be boarding schools? Shall they provide two complete courses of instruction, classical and special? How shall discipline be maintained, etc.? Incidentally to this we are given a complete history of secondary instruction for both boys and girls. The tenacity with which the humanities have held their place is shown by the fact that M. Gréard could write in 1881: "It is sixteen years since the law instituting special secondary instruction was passed. It is nearly three centuries since its utility was established. The exclusive partisans of instruction in the humanities forget too often that the 17th century, the classical century *par excellence*, was its cradle and the founder of the French Academy, its godfather." Richelieu exposed the absurdity of exclusive classical instruction; fifty years later Claude Fleury wrote with equal plainness on the subject, and in fact all the reformers of the 18th century held but one opinion; practitioners, financiers, merchants, and all below them, ought to do without Latin. While nothing was done in France, Germany established her *real* schools, and in 1831 France sent a commission to examine them. In the report of the commission Victor, Cousin said: "A

cry goes up from one end of France to the other demanding for three-fourths of the French population establishments between the simple elementary schools and our colleges." This appeal gave rise only to a timid experiment. Even in 1865, when the law was passed establishing the schools for special instruction, opposition still existed, strong enough to hinder for years their progress and usefulness.

Nearly 150 pages are given to the history of schools for girls. The laws establishing primary instruction passed by the Constituent Assembly provided for girls as well as boys, but the schools were organized slowly and with difficulty. In 1800, there were in each arrondissement of Paris two public schools, one for boys and one for girls. They were without books or furniture, and almost without pupils. In 1810, Mme. de Genlis inspected the primary establishments, public and private, and discovered much pernicious abuse. She persuaded the emperor to consider a plan of a gratuitous school for the people, but Waterloo swept away that with everything else. A law was passed in 1850 requiring all communes of more than 800 inhabitants to support a school for girls, though exceptions were permitted in the case of the poorest communes. In 1867 the limit of population was placed at 500; in 1881 at 400, and the State assumed a part of the expense. Public schools for the secondary instruction of girls have existed only since 1880. Convents and private schools supplied the lack so far as it was supplied. Eminent men and women wrote on the subject of the education of women, and established schools which flourished for a time, but no government dealt seriously or efficiently with it. Decrees were passed from time to time which regulated the programmes and prescribed the qualifications of teachers. The decree of 1837 may be regarded as the first charter of secondary instruction for girls. Nowhere have questions concerning the manner and object of female education been more intelligently and freely discussed. The programmes sketched by women for women did not lack amplitude, but a variety of knowledge was not the end sought. Above the extent of knowledge they placed the rectitude and firmness of reason; to that they subordinated everything else. Their precept was that of Fénelon who thought reason could not be talked to children too soon nor too often. Reason was the rule of Saint-Cyr. On this subject Mme. Maintenon could not say enough; reason was the form of her sensibility. Mme. de Lambert recommended her daughter to live in company with her reason. Mme. d'Epinay and Mme. Guizot express themselves similarly. To reach the depth of the mind one counts less on instruction properly so called than on reading and reflection. Mme. Geoffrin declares that she had no other education; in her childhood her grandmother taught her nothing but reading, but she made her read much, and reason about everything that she read. Girls too *bookishly* brought up are to be pitied according to Montaigne. What is wanted is a practiced and free intelligence. The too great dispersion of the mind is deplored by women jealous for the good name of their sex. Mme. de Staël says, "The development of a faculty should not be weighed against the acquisition of a little more knowledge." Of the fourteen hours which make the active day of a girl, Mme. Necker would give only four to work; the remainder should be used for rest, the cultivation of the arts, physical exercises, and in the company of the family, where instruction is completed and made useful by the exchange of observations, feelings and ideas. Women, according to her, ought to have a taste and a facility for study, rather than much knowledge. She would have them cultivate a habit of application, a desire to gain new ideas, would inspire them even with a taste for struggling with difficulties, and excuse them from science. For himself M. Gréard says: "Two things are to be considered in education, the acquisition of knowledge and the development of the facul-

ties. One cannot be conceived of without the other but they differ from one another in a certain degree according as it is a question of men or women. Independently of a well made mind, which nothing can replace, a man has need of a stock of knowledge firmly established, preserved with care, often renewed, always ready, that serves him in the performance of his duties, in his business, in all the conduct of his life. This is not true to the same extent of a woman. What in her is most useful to herself and others, what is of the highest value in her, is not what remains of acquired knowledge but the mind which that knowledge has helped to form. The first aim of a well directed education should be to assure to a young girl that high moral culture which makes the human being; to inculcate in her that respect for truth and that love of sincerity which constitute the integrity of the intelligence and of the heart; to form in her, finally, as the most precious dowry which instruction can give, what is familiarly called a good judgment capable in serious or delicate situations of deciding quickly and well. Here is the true ground of equality between men and women, the moral equality." Mme. Necker values knowledge too lightly, but she is right in demanding that the mind must not be sacrificed to knowledge. This is the fault of modern education. Without saying that, once the measure exceeded, one obtains as much less as one demands more, there is reason to believe that excess fatigues the mind irremediably. This universal effect of the development of civilization is the more to be feared, because, in proportion as the programmes are extended, the time given to them is curtailed. The child has less and less time to learn more and more things. If the resulting danger is to be feared for boys, there is still stronger reason for protecting girls from it. For them, above everything, education ought to be a work of discretion and choice. It is not a question of educating them without effort on their part, still less of making knowledge less exact; but of making science, true science, more assimilable, and of freeing it from all that is not indispensable to the education of the mind. What we demand for them is a sober instruction divested of unnecessary details, an instruction of results and conclusions, which puts, with exactitude, the feelings, the ideas, the inventions, the discoveries, the great gains of civilization, in strong lights. M. Gréard admits that teachers capable of giving such instruction are difficult to form, but says the normal school of Sèvres will furnish them.

The second volume opens with a chapter on overpressure. What has been said and done in England, Germany and Switzerland is told with a good measure of detail. Overpressure is recognized as the natural consequence of a developed and complicated civilization. Every century has introduced into its régime of education the result of its discoveries and its researches, the bias of its interests and its needs. Then follows a complete history of the courses of study in use since the sixteenth century, an instructive chapter in the history of the human mind. From a philosophic point of view this continuous development is not wanting in grandeur; examined in its effects it explains the evil of overpressure. Before 1789 instruction was consecrated to ancient letters; under the Revolution it was occupied with science; under the Consulate, broken into two currents, it embraced both letters and science, though both were brought into one channel by the Empire. After the Restoration letters were again in the ascendant until the second Empire made an unfortunate attempt at bifurcation. Unity followed this for a period, but at the present time there is a division almost equal between the two. One hundred and fifty pages are given to a discussion of ways and means of amelioration. The following paragraph has special interest. "We recognize gladly to-day that work being only the development of natural activity the exercise of this activity ought, first of all, to make him who follows it happy. Does the child dislike the task given him?

It is because the task is not suited to his needs or his intelligence. If he is agreeably excited, all is well; there are no bad pupils, there are only bad masters and bad methods. It is this view that has so much ameliorated and multiplied the practical means of study,—maps, pictures, apparatus for explanation, and collections. The spirit of education is changed at one stroke. There was never in the primary classes nor in the Lycées so much interest and life. The parents who follow the work of their children notice it, the children also. The scientific phenomena exhibited to them amuse them; for them they will give up everything else, arithmetic, history, grammar. This is an evident sign of the value these demonstrations have as a means of awakening the growing faculties. Perhaps also we ought to take warning by it. If it is indisputably useful for them to be pleased in examining the forms, the exterior arrangements of objects, to watch the decomposition or recomposition of bodies, to observe the play of some great law in its natural manifestation or picturesque representation—it must be said that after a certain time when their senses have been rectified, sharpened, formed, this kind of study is less work than distraction; it occupies them rather than exercises them. We have banished ennui from our primary classes; it will never return; let us take care lest in too great a degree we banish effort." It is the merit of contemporary pedagogy that in the midst of the disagreement concerning systems everyone admits that the coördination of studies is a matter of the gravest psychological interest. The scheme adopted in Germany and Belgium M. Gréard thinks more useful than any other, because of its logic, the rational gradation of the studies, and the advantage which it affords for concentration of effort. Variety in studies is necessary; the masters of Port-Royal were the first to remark that monotony in lessons dulled the mind; but diversity becomes an evil when it disperses the strength. "The diffusion of instruction" said Dr. Karl Reiman "makes the scholar a vagabond." Unity of direction is the first guaranty of a good education. M. Gréard has no revolutionary methods to propose. His reforms are modifications. He would reduce the number of pupils to a teacher, the number of hours of work, mingle judiciously oral and written exercises, leave more liberty in respect of programmes to the master, but above all circumscribe the field of instruction. Programmes are too well made, that is, made by specialists. Every man has brought his stone to the edifice and in admiring the fine structure we have forgotten the condition of those who are to live in it.

The concluding chapters treat of school discipline. Little new light is thrown on the subject. The utility of public education and free intercourse between pupils is shown, the advantages of parental oversight to enforce and soften the discipline of school are exalted, but M. Gréard sees that in this department of education, even more than in teaching, no system will avail; only sympathy with pupils and personal character will accomplish the end. Each volume has an appendix of tables showing the distribution of Lycées and Colléges, the number of pupils at different times, the social condition of the parents, the professions followed by the pupils, the programmes under the various decrees, etc.

E. M. H.

Quelques mots sur l'Instruction Publique en France. Par Michel Bréal Paris 1886 pp. 407.

In his preface M. Bréal laments the evil effects of the strong national feeling,—a feeling which hinders France from learning from other nations,—coupled with a fatal conservatism. New and useful ideas are by no means wanting to the French but they fail to embody them in institutions. Meantime other nations avail themselves of them, and

when France finally adopts them she borrows them from foreign countries. This is especially noticeable in the conduct of public instruction. M. Gréard makes the same lament in his *Education et Instruction*. France was far behind the protestant countries of Europe in establishing primary education, partly because the stress laid by protestants on the reading of the Bible made primary instruction of the masses a necessity. Much as the late awakening to the need of universal education is deplored however, the evil consequences of such instruction as has been given are so apparent and so certainly traceable to the schools, that one is tempted to see in them only a mistake as to the benefits to be derived from education. The pedagogical errors of teaching to young children the formal grammar of their mother tongue (an error growing out of the teaching of Latin grammar), of persistent attempts to impose on them a literary form of language, by an excess of written exercises, of tormenting them with the niceties of spelling, have resulted in stupefying and perplexing the mind to an extent that hinders it from making any effective use of language as an instrument. Language is no longer the servant but the master. But as the cure for the evils of newly acquired freedom is freedom, so the cure for the evils of instruction is instruction, instruction broader, less formal, less mechanical. If children speak a provincial dialect, let them continue to speak it, and show them its essential dignity by telling them something of the history of language. Instead of spending time on the different forms of written plurals when no difference exists in sound, encourage them to talk, and show them how to express the contents of their minds by means of a vocabulary that will be understood by their parents and associates. Instead of making them repeat rules for the formation of participles, make them repeat what they have read, make them learn and repeat much poetry, and especially such poetry as relates to the life of the home and the nature that they see. To know how to read yet have no taste for reading is to have been badly and imperfectly taught to read. Children should read much, and read a variety of books in school; books of travel and adventure, epic poetry, records of noble deeds, Robinson Crusoe, Perrault's Tales, selections from the Arabian Nights, Grimm's fairy stories, and among living writers Erckmann-Chatrian and J. Macé. The teaching of geography and history is scarcely more efficient than the teaching of reading, if one judges by results. A people that despises its past, and whose army is embarrassed in its movements by the ignorance of its officers concerning the natural features of their own country has need to look to its schools. What is wanted here is a clearer conception of the end in view and more intelligence in adapting means to that end. A better knowledge of the products of the different communes, and of the habits and character of the inhabitants, would tend to foster unity of feeling; a knowledge of foreign countries would correct the prevalent false opinions of one's native land. A connected course in history is not recommended for primary schools, but detached portions relating to the greatest events and the most efficient and exemplary men, whether statesmen, inventors, benefactors, or authors, should be read and commented on by the teacher. Verbalism, the greatest fault of all teaching, prevails in all grades of schools because the teaching of *things* is so difficult. Guts Muths relates that Pestalozzi toward the end of his career pointed out with his finger the different drawings on a blackboard while the children repeated mechanically the names that they knew by heart. M. Bréal himself remembers a master who sincerely believed that he was teaching *things* because he made the class say all together "The horse is a quadruped. The seal is an amphibious animal." The introduction of a generous supply of objects into the school will not suffice. If the master sleeps, an instant verbalism gets the upper hand. Nothing will replace

the living action of the master. Without that, images, drawings, descriptions degenerate immediately into a series of processes and vain mnemonics. If the government wishes schools worthy of a great country like, France it must give to instructors the leisure and the security which make it unnecessary for them to bend over their work from morning till evening till under the weight of life the internal springs are broken. Instruction in the Lycées is not more intelligent nor more effective than in the primary schools. The method of teaching Latin defeats its own ends. The inestimable benefit which comes from studying a dead language, is that it broadens the mind by obliging it to enter upon a new way of speaking and thinking. Every grammatical rule and every construction which differs from the usage of the native tongue must be for the pupil an occasion of reflection. The task of the master is not to remove all difficulties from the way but only to arrange them methodically and present them gradually. It is not a question of shortening the road, because it is the road which is in some sort the end proposed. But this is not the idea of the text books. Under pretext of making the work of composition easier and the meaning of authors plainer, they take away all need for logical and grammatical effort. To render a French idiom by a Latin idiom is their only aim. One would judge from the grammars, that the Latin existed only to be turned into French, or that French might be turned into it. The method secures the application of the pupils and develops a sort of dexterity in copying a model; but the power of understanding another language than one's own, of going out of one's self and one's times, is lost sight of and allowed wholly to escape. So far from exercising the reason of children the method used dulls the grammatical sensibility. If the end in view is reading classic literature, that also is lost, for very little reading is done. Except that no Greek verses are written, the same means are used for Greek as for Latin; the grammar slowly learned by heart, themes, translation, dictionaries stuffed with expressions. But the reading is even less than in Latin. "Is it with six dialogues of Lucien, half of one life by Plutarch, half of two books of Homer, one tragedy of Euripides, and another of Sophocles, and the beginning of one oration of Demosthenes slowly blundered through in five years, that the richest and most varied language that ever existed can be learned?" Yet by Greek it is possible that the whole system of instruction might be reformed, since the bastard humanism of the eighteenth century is not attached to Greek as it is to Latin. In each Lycée one or two professors chosen with care might read Greek authors once or twice a week with the best pupils of each class. The minds of the young, so prompt to seize beautiful sentiments and expressions, so open to sound philology, would immediately feel the difference between a true and false antiquity, and when once the reading of texts, the profound study of ancient writers had been welcomed in a corner of the colleges, they would reduce, little by little, the useless exercises, and gain the place which is due to them. The custom of passing boys on from class to class, whatever their habits of application or their abilities, and leaving them at the end of their course to struggle as best they can with the examination for the Bachelor's degree, is strongly condemned. Like many other thoughtful Frenchmen M. Bréal finds the boarding-school plan in every way bad, and recommends a gradual change to the German custom of placing boys who can not be educated while they remain at home in families, where they can be free from military discipline and cloistral seclusion and restraint. In superior instruction also a change to the German method would be a great gain. Free lectures open to the public are not conducive to scholarship on the part of professor or student. On the question whether the purposes of superior instruction are best served by special schools like the *Ecole Normale* and the *Ecole Polytechnique*, or

by chairs in universities, strong ground is taken in favor of the latter. The usefulness of the special schools might be greatly increased by changing or abolishing the restrictive rules as to the age and qualifications of candidates and the necessity of taking the entire curriculum if one enters the school. There is a lamentable lack of elasticity in the system. The French student, so long as he is a member of any school, studies for the purpose of passing an examination and is kept in the leading strings of discipline. M. Bréal demands for him freedom to study simply for the ends of study, and exemption from the tyranny of rules made for the indolent and mischievous. E. M. H.

De l'Organisation de l'Enseignement dans l'Université de Paris au moyen-age. Par CHARLES THUROT, Paris, 1890 pp. 213 and 4.

This is a book of details. It is not a history, but a collection of particular facts relating to the organization and administration of the great University from the end of the twelfth to the beginning of the sixteenth century. In the sixteenth century, along with feudalism scholasticism, and the religious unity of Europe, the University of the middle ages came to an end. One learns here the number of lecturers, masters and students in each of the schools at different times, what hours of the day were given to study, what vacations were allowed, what tests were required for degrees, how the students lived and how they conducted themselves, what was the rent of a room and the cost of board as well as the greater facts of independence and development.

The University sprung from the teaching of Abélard in the school of Notre-Dame. in his lessons he gave logic the sovereign place, and his example created a passion for disputation and teaching. His reputation drew to Paris students from all nations, and his influence was felt long after his death. Paris was filled with schools and masters, many of which owed their origin wholly to Abélard and were entirely independent of control civil or ecclesiastic. His word peopled the hitherto unoccupied fields on the southern slope of Mount Saint Geneviève, and his disciples remained there after his departure devoting themselves for years to the study and practice of logic. It was the union of these schools with the theological School of Notre-Dame that formed the University of Paris. In the twelfth century there was no semblance of association among these schools. Abélard seems to have inspired his disciples with a passion for independence. They began to teach almost as soon as they began to study, and each sought to distinguish himself by new doctrines. Heresy was popularised. Laymen read the gospel and opposed its precepts to the manners of the clergy, asserting that they themselves were more faithful to the example of Jesus Christ and his apostles. These dangerous symptoms called the attention of the bishops to the freedom of instruction, and in the second half of the twelfth century persons wishing to teach were required to obtain permission of the ecclesiastical power. This is what is called the license (*licentia docendi*). The right of granting this permission was exercised by the chancellor of the Chapter of Notre-Dame, and in the early part of the thirteenth century he exercised it in so arbitrary a manner that the masters combined to defend their common interests against his despotism. In the struggle that followed, the Pope took the side of the schools, and in 1252 Innocent IV gave to the university the right of having a seal of its own. This right was the sign and the guaranty of complete independence. At the same time the interior organization was completed, and from the year 1250 the elements of the seven corporations which composed it can be distinguished. It was a university of masters and not of students. Only those who had taken the degree of master of arts could become members of the Faculty of arts. Only those who had taken the doctor's degree could participate in the delibera-

tions of the other Faculties. The four nations and the three Faculties were separate companies completely independent of one another, but together constituted a federative republic. The Faculty of theology was an aggregation of communities regular and secular who did not all enjoy the same rights. The Faculty of law was small and homogeneous. The Faculty of medicine was subdivided for elections, as was the Faculty of arts, into four nations. All powers were concentrated in the assemblies of the companies. They made the regulations and nominated directly to all offices. The authority of the chiefs of the companies was more honorary than real. They convoked the assemblies, presided over them, and represented them, but acted usually only as they were directed. The rector was changed every three months. The chiefs of the nations, or *procureurs*, held office for a month but could be reelected. Each nation and each Faculty had its own officers, its own seal, treasury, patron and masses. Certain questions were reserved to the assembly of the seven companies *en Université*. Such were the following: the privileges enjoyed in common by all members; the violation or abuse of these privileges; and the control of certain industries that depended on the university, as the sale of books and parchment. This purely federative régime tended strongly to anarchy. The Faculty of arts filled with turbulent youth could not agree with the Faculty of theology composed of older and more sedate men. The four nations had abundant causes of discord. The Faculty of theology was made up in part of seculars and in part of regulars who could never submit to any laws but those of their order. The assemblies were so turbulent that moderate men did not attend them. The University was maintained by force of habit and the influence of tradition. Neither the University, nor the Faculties, nor the Nations made any list of the names of students until 1279. The student on arriving attached himself to a master, who demanded him when the provost put him in prison, presided at his *actes* when he took his degree, and asked necessary favors for him in the assemblies. Sometimes the students served their masters at table or as grooms.

The distinctive character of the instruction given may be inferred from the formula of Roger Bacon. "When one knows the text one knows all that concerns the science that is the subject of the text." The author of the book was the authority, and when the teacher had explained or the student learned the contents of the book all was done. The scholars knew no exercise but the *dispute*. They disputed before dinner, they disputed during dinner, they disputed after dinner; they disputed in public, in private, in all places, in all times. These disputations were often disorderly and even indecent, but they counteracted the danger of submission to authority. One must give a reason for what he believed, and be prompt and fruitful in resources. The doctors of theology were charged with the defence of the true faith. To sustain the true is to combat the false which is the opposite of the true. All the secular communities, or colleges, were founded by private beneficence. They served to place poor students who did not belong to any order on the same footing pecuniarily as the members of orders. In the fifteenth century was introduced the important revolution of placing the students of the Faculty of arts in boarding houses where they were constantly under the eye of a master. The impossibility of inforcing discipline and the need of protecting themselves from the consequences of their lack of control when royal authority began to be more regularly exercised, forced the University to this step. In the thirteenth century the papacy and the University of Paris were considered as two correlative powers. One Pope maintained the unity of religious authority; one University maintained unity in matters of doctrine. Hence the popes consented to the establishment of new universities with reluctance.

In the schism, however, France adhered to the popes of Avignon, Germany to Rome. The emulation of the German princes was excited. Rome had no interest in the University of Paris, and Germany was accorded a Faculty of theology and five Universities provided with all the Faculties. The study of law was not important in the middle ages. The study of Roman law in fact disappeared completely, and the study of canon law was joined to the study of theology. At Paris the Faculty of law took the name of *Faculty of Décret* from the work of Gratian. The centre of the study of law in the thirteenth century was Bologna, where the University was organized on a system differing fundamentally from that of Paris. In Paris, as has been said, the power of administration was wholly in the hands of the professors. In Bologna it was in the hands of the students. All the Faculties of theology and philosophy in the middle ages were organized on the model of Paris; all the Faculties of law on the model of Bologna. The organization of schools in all Christian Europe was divided between these two systems. The first was followed exclusively in England and Germany; the second more generally in Italy, Spain, and the south of France.

E. M. H.

Manuel d'éducation morale et d'instruction civique. Paris, pp. 286.

In this manual instruction in morals is founded on religion. The child is first taught the difference between man and the animals, the nature and faculties of the soul, his relation to the moral law, and the proofs of the immortality of the soul. Proofs of the existence of God, explanations and illustrations of his attibutes, man's duties to God, worship, Jesus Christ, and the church, are the topics of the second chapter. The family, the school, duties to one's self, social duties, the native land, each with its sub-topics, fills a chapter. The teaching is dogmatic, but is illustrated by quotations from poets and moralists and by anecdotes. The nature of the illustrations will be best understood by specimens. Under the heading of *Duties of parents to their children* is the following. "An effective punishment."—At the age of three years the child who later became Saint Francis of Sales stole a small article from a workman. At the first question he perceived that he was to blame and asked forgiveness with tears so affectingly as to make his hearers weep; but M. de Boissy, his father, fearing the consequences of a first fault of this kind if it remained unpunished, was inexorable and whipped him in presence of several persons. This punishment, the first and the last, was so beneficial to the child that he never again took anything without permission, not even fruit from his father's garden."

Under *Filial piety* something very different is found. "In 1879 l'Académie bestowed a prize of virtue on Miss Léontine Nicolle. Her father was dead; her mother became insane and was sent to the hospital of Salpêtrière. Léontine had the means of living but she did not wish to give up her mother to the care of strangers. She obtained an appointment at the Salpêtrière as attendant, and for twenty-seven years lived voluntarily with the insane, lavishing the tenderest care upon her mother, who did not even recognize her."

Towards one's body the first duty is not to destroy it by suicide. Towards one's neighbor to keep the commandment "Thou shalt not kill." The nature and the wrong of duelling are treated in two pages, and slavery at nearly the same lenght; but to offset such crudities we find the story of the heroic devotion of the archbishop of Paris in the insurrection of 1848.

Civic instruction embraces *Government and Administration of France, Elementary notions of common law*, and *Notions of political economy*. The teaching is unrelieved by illustrations of any kind.

E. M. H.

Psychologie de l'Idiot et de l'Imbécile par le DR. PAUL SOLLIER, avec 12 Planches, Paris. Alcan. pp. 376.

Dr. Sollier states in his preface that this is the first work of its kind, so far as he knows. The bibliography of the subject, less rich in France than in England and America, is composed of documents on the causes, classification, and physical signs of idiocy, and the pathological anatomy and education of idiots. The psychology of this class of persons has not received much attention though the study of their intellectual difficulties has been begun in Germany. This work sets forth the general and characteristic traits, not of particular idiots or imbeciles, but of the idiot and imbecile in general. The author's own observations in the hospital of Bicetre as interne and conservator of the Pathological Museum extend over four years, and he has been liberally furnished with documents by the eminent director of the hospital, Dr. Bonneville.

The heads of the chapters are: I. Generalities and Classifications. II. Descriptive Methods. III. The Perception of Sensations. IV. The Attention. V. The Instincts. VI. The Emotions. VII. Language. VIII. The Intelligence, so-called. IX. The Will. Personality, Responsibility. The classification is not pathologic but symptomatic, and is based on what the author calls the key of the arch of intellectual development—attention. The classes are three in number: 1. Absolute idiocy; *complete absence and impossibility of attention.* 2. Simple idiocy; *attention feeble and difficult.* 3. Imbecility; *attention unstable.*

Seguin is quoted as summing up the psychological symptoms of the idiot in the statement that, "Physiologically, he *can* not; intellectually, he *knows* not; mentally, he *wills* not. He *would be able* and he *would know* if he *would will*; but before all and above he *does not will.*" Sollier dissents from this. It seems to imply that the mental faculties of the idiot are, so to speak, normal, but diminished, and that the will alone is at fault and hinders him from exercising them. But as it is impossible for a man of moderate intelligence to become a man of genius whatever may be the force of his will, so it is equally impossible by any exercise of will to become a man of moderate intelligence. The faculties of of what it is agreed to call the human soul possess solidarity and are in direct relation to the state of the brain cells. When the brain is injured or diseased as a whole, as it is in idiocy, all the powers are affected. It is not then in the will taken apart, regarded as something distinct from the rest of the soul that we must look for the explanation of idiocy. We must not look for the cause in the diminution or absence of any one faculty, pathologic anatomy forbids that; but if we take another point of view and ask what is most important to the development of the idiot, what that is without which education is impossible, or in the degree in which it exists makes education difficult or possible, we must say *attention.* This view is supported at length in chapter IV.

After a detailed examination of the condition of the idiot in respect of each of the senses, the conclusion is reached that the state of the sensibility and of the power of motion is intimately bound up with the intelligence, and that to develop the intelligence it is necessary to begin by developing the senses and the power of movement. This is the principle on which Seguin has founded the method of educating idiots, which, enlarged and applied by Dr. Bonneville at Bicetre, has produced such remarkable and encouraging results. Chapter IV is an examination of the state of the attention in idiots and imbeciles, based on what has been observed in normal individuals. In this respect the plan follows that of Ribot in his book on the psychology of attention. The attention, whether strong or feeble, everywhere and always has for its cause the emotional or affective state, and its mechanism is essentially motor,

that is to say, it always acts on the muscles, principally under the form of inhibition. The movements of the body, the face, the limbs, and the modifications of respiration are the necessary conditions, the indispensable factors of attention. To sum up, given the emotional state and the motive power, and we have attention. If these two elements are wanting or morbid, as they are in the idiot, the lesion of attention is easily conceivable. On the question whether or not language has a relation to intelligence, Sollier agrees with Seguin that it has not. First, because there are very intelligent persons whose language is defective, and even children in whom it is never developed; second, because it is the receptivity of language which is the sign of intelligence and not its emission; third, because there are idiots completely without intelligence whose speech is more developed than that of others who are far in advance of them intellectually. While it is probable that normal persons after having used words are not able to think without them, it is manifest that with idiots the idea and the word are independent. Certain idiots whose vocabulary is extremely restricted know a somewhat large number of things, and are capable of work which must be understood and which demands a certain application. The best proof that they apply intelligence to it is that they improve. Acts that are automatic are not susceptible of improvement. There is a stage at which the child connects his ideas to words. This is the point most difficult to reach with idiots. With the child the imitation of the word often precedes the comprehension of it. This is shown by the frequent repetition of a newly learned word which the child uses on all occasions. It is most noticeable in those children whose faculty of articulation is great and precedes the development of general intelligence. In the idiot this demarcation is more clearly seen and it happens in some cases that he imitates and repeats aptly not only words but phrases of which he never understands the sense. This is a proof that the word and the idea are independent and that, if the idea does not precede the word, the word is powerless to awaken it. Certain idiots remain at this stage. They can be taught to articulate, but they can not go any further and the connection between the idea and the word escapes them.

Binet's explanation of the mechanism of reasoning is fully in agreement with what is observed in idiots and imbeciles. The perceptions being preserved—when they are preserved at all—in an ill developed or diseased centre, leave false or confused images. By the law of association the similar or contiguous images act on one another reciprocally, and feeble or false images must be the result. In the case of idiots the images being feeble the perceptive reasoning is feeble, or is not produced at all if we may judge from the only means that we often have of knowing that it is produced, namely, by the act that it provokes. With the imbecile, on the contrary, there is a great number of images, usually falsified by a perceptive centre that performs its functions imperfectly. The associations are often made by contiguity, and the reasoning has many chances of being false for that reason; the two sensations which have given birth to the two contiguous images have no bond between them, but the subject gives expression to them nevertheless, for want of more rational associations. This explains the want of connection in their conceptions, and the unexpected observations that they make. The idiot associates more simply, by resemblance; the consecutive sensations in his case have no bond between them, because in consequence of his want of attention and his difficult memory he is for the most part conscious of the present moment only.

The difference between the idiot and the imbecile is everywhere insisted on. The idiot's mind is characterized by feebleness; the imbecile's by perversion. The idiot lacks the power of attention and therefore cannot receive ideas; the imbecile has attention, but it is so unstable that

although he receives ideas he can not retain them. If the attention of the idiot can be seized he will listen and learn: the imbecile's attention can be easily seized but can not be fixed upon any one thing. The idiot learns by repeating an act until it becomes automatic; the imbecile learns with more difficulty because his attention turns so rapidly from one thing that repetition is nearly impossible and the act cannot become automatic. The idiot admires what is loud, brilliant, striking; the imbecile what is absurd, grotesque. The one is controlled by gentleness and repelled by harshness; the other must be governed by force and intimidation. In his relations to society the idiot is extra-social because of the feebleness of his powers; the imbecile is anti-social, perverse, hostile. As to the treatment of the two by society, Sollier's opinion is sufficiently expressed in a few maxims. Society ought to protect itself. We should not talk of responsible or irresponsible persons, but of useful, incapable, and harmful individuals. The useful should be encouraged, the incapable should be protected, the harmful deprived of the power to injure. Idiots belong to the first two classes, imbeciles to the last. E. M. H.

Questions d'Enseignement National par ERNEST LAVISSE, Paris. pp. 338.

This volume, consisting of articles and addresses, is of special interest as a contribution to the history of that effort for reform in the higher education in France which has but recently culminated in the new law creating true French universities on the German plan. The leading thought running through these papers is that of the necessity for students in the higher education in letters. The anonymous audience of the old system was no stimulus to the professor, because it was without definite needs; hence the work of the faculty also lacked unity, method and continuity; while on the other hand the nation at large was suffering from the inadequate preparation of the great majority of professors of secondary classical instruction. By the establishment of classes for conference and study, and the creation of scholarships for candidates for the degrees of licentiate and agregation, the first steps towards needed reform were taken. In the beginning, the students in these "Cours Fermés" were for the most part future professors, but it was never intended to limit the advantages enjoyed to this class; and the character of the instruction given was rather to train minds in scholarly habits of study-research than merely to qualify for the taking of certain degrees. The increase of the students in number and zeal has been steady and marked; and the gain to France in thus utilizing her best teaching forces for the elevation of the standard of general public instruction and general culture emphasizes the truth that "the higher education is not the superfluous, it is the necessary."

To M. Duruy, Minister of Instruction in 1868, is due the honor not only of having started this movement in the two faculties, those of science and letters, where the need for reform was most urgent, but also of originating the programme which has since been carried out step by step in its least details. His successors, M. M. du Mesuil and Dumont, were successors in spirit as in office, and through their efforts and the activity and zeal of ministers like Ferry and Waddington the good cause made steady progress. The nation, though just recovering from a terrible crisis in its history, responded with readiness and liberality to the heavy calls made upon its resources. In 1868 the State, after collecting dues for examination and inscription, had spent 200,000 francs upon the higher education; in 1884 the expenditure for the same purpose had reached 11,000,000 francs.

Three papers are of special interest. The first, that on "Historical Instruction in the Sorbonne," explains the causes of the indifferent or partisan spirit in which the French often regard their national history

and describes the schools in existence at that time where special historical study could be carried on. A brief account of the reforms instituted in the department of history in the Sorbonne follows; and the article concludes with an eloquent plea for the supreme value of such intelligent instruction in the history of France as shall awaken and stimulate genuine patriotism. In the article on "The Teaching of History in the Primary Schools," many admirable suggestions as to methods of historical instruction for children are given. In the paper on "German and French Universities," while cordially admitting the superiority of the German system, Lavisse points out some of its obvious defects. He urges that every radical reform should not be prematurely pushed, and that essential differences in character and needs between Germany and France should naturally determine differences in their University systems.

The entire volume, though dealing with what is now to a large extent a past issue, is so admirable in style and spirit, and so full of wise suggestions, which are always timely, that it can be cordially recommended to all interested in educational questions.

C. H. S.

Thirteen Essays on Education. London. 1891. pp. 321.

This volume contains thirteen essays from members of an association of English head masters, calling themselves "The Thirteen." The subjects discussed are as follows: (1). Principles and Practice. There are three classes who have to do with the schools,—the teachers, the public and the theorists. The theorists do not produce an important effect on the education of the country. The schoolmasters are in an almost helpless subservience to unrestricted public opinion. Education is nominally in the hands of the schoolmasters, who know little about it; virtually it is controlled by the public, who know nothing about it. (2). The Teaching of Music in Public Schools. Choral music should be taught to a majority as a real subject of study, but not by the sol-fa or tonic-sol-fa system. Boys should rarely be encouraged to sing tenor. Unison singing should be encouraged as a help to the less musical ones. (3). Religious Education of Boys. Religion is as vital to the school as to the state. Since boyhood is immature, emotional and prospective in its nature, all religious as all other teaching should respect the boy's nature in these matters. To help to this end the chapel should be a place reserved for the boys; the services should be hearty, not too numerous nor too long. There is danger of preaching over boys' heads. Sermons addressed to boys ought to be interesting and sincere. (4). The Scholarship Question. This essay seeks to find a method by which the University scholarships may be attained by those who most deserve them and at the same time need the help they give. This topic is of direct interest to England alone, for the system of scholarships in vogue there is not found elsewhere. (5). Commercial Education. The cry for commercial education is essentially a cry for a general, as distinct from a special education; on that ground, if for no other reason, the cry is welcomed, and by following the demand the general level of education will be raised. (6). The Prospective Character of School Training. The test of all school training lies in the question, How has his school training fitted him to spend his vacant time? Just in proportion as a school shall have helped a boy to occupy his vacant time in the day and in the night usefully, healthfully and pleasantly, will it have been valuable to him and to the community of which he is a member. (7). The Teaching of Holy Scripture. Since Cambridge and Oxford have dispensed with examinations in Biblical and doctrinal knowledge, more effort is necessary in preparatory schools. The plan for bettering the condition and keeping up the religious part of school

life should recognize (*a*) the varying Biblical knowledge of the boys and the exact state of their faith when entering school, and (*b*) adapt the teaching to these conditions. (8). An Educational Museum. France spends annually £1,600 for her Musée Pedagogique, Japan £3,000, but England not a penny. The good results are many from such a museum. The tendency in England is to neglect even what it has, as shown by the South Kensington Museum. (9). The Teaching of English Literature. The method thought to be the best is what the writer terms a "rational indirect method," by which method he "soaks" the boy full of some few authors. A course is outlined for five grades beginning with the boy at 10 or 12. It is a well written unequivocating essay. 10. The University and Specialization. Those who specialize early get the University scholarships, but their progress through the University is impeded for lack of general culture, and their subsequent careers are not highly successful. The best men are those who have gone into a specialty after a broad general literary culture has been attained. The last three papers are on the Greek question. Two of them argue for Greek in the secondary schools, while the third argues for postponement, and gives much evidence to prove that his thesis is the correct one. The book, as a whole, gives one an insight into the secondary schools of England and the spirit of her head masters. F. B. D.

Aristotle and the Ancient Educational Ideals. THOMAS DAVIDSON. Scribners' Sons, 1892. pp. 256. "Great Educators" series, edited by Nicholas Murray Butler.

The key to all the Greek ideals is proportion or logos, the end is Worth, and the means Effort. The pupil must be made "a speaker of words and a doer of deeds." He is made worthy (or genuine, earnest), first by birth, second by habituation and training, and third by instruction. Birth is the most "ancient wealth and worth." Thus match-making was with a view to offspring. Then comes practice, whether in virtue, language or art, with rules and theory, explanation and reasons later, after authority and established habit. Last, and crowning all came instruction. Mere habit leaves men slaves, but knowing the why, and intellectualizing, makes men free. This latter especially was intended only for the few well-born and rich. Politics in changeful little states is itself a great school. The Greeks were a mixed, versatile race. Letters first arose in the service of diplomacy and trade. The old Greek education was for the state. The state was the Alma Mater. The young men aged 17–19 received a degree of cadet, *ephebos*, or citizen-novice. In Sparta they must present themselves naked before the ephors every ten days to see if their limbs were flabby, soft or fat. Each lad had an "inspirer" or mentor, but every citizen could correct him. Pythagoras (like Isaiah) first started an ethical community apart from the state. His long novitiate of obedience, silence and self-examination and his "golden words" are well known. The older Ionian ideal is embodied in the ephebic oath, the Aristophanic "good chest, clear complexion and a short tongue;" abstruse thinking had not paralyzed them. Schools at Athens were often out of the city, not public, although the state may have owned the buildings; till Plato higher education was unknown. The great "music" (including letters) was probably taught near if not in the same building as the gymnastics; and between both, school hours were very long. Music was at first only to "sweeten" words by cadences and inflexions, and must not be divided from them. Each boy made his own reading book. Music and letters were for "purgation" or for relieving the strain of emotions which ought not to be brought to the dignity of fullest expression. Dancing stirred the whole body and soul, and in it intermediate education culminated. Exercises were curriculized in the five games.

The state was the university, citizenship a degree and its officers a faculty of sages. The new education was when "Vortex dethroned Zeus." The merchant marine which conquered Salamis brought into power a new and more alien class of rich traders; and an individualism stimulated by Sophists, to which the state was a means and not an end in itself, arose; and national decay and the Peloponnesian wars followed. Old divine and human sanctions lost their power. Socrates would substitute a new authority, based on self-knowledge. Xenophon's pedagogic ideal was the old system become self-conscious. Plato strove to think whole thoughts and developed the ideal of the extra or "super civic man." Man becomes a sage by the vision of eternal truth, for which the superior man longs with a love akin to madness. The Republic is his youthful ideal, and its Utopianism is greatly toned down in the Laws. In both, those who can be reduced to harmony must rule the others.

Aristotle, "nature's private secretary," studied long and wrote late in life. He "thought where Plato dreamed," and was more cosmopolitan, and "a forerunner of Christ." His "State" was like the "pedagogic province" in Goethe's Wilhelm Meister. School overseers or "child-herds" must give great attention to games, and play, and music. Education ends in passing from the practical to the contemplative life of God. Later efforts to re-merge the man in the citizen failed and the state declined. A brief account of Quintilian and Plotinus follow, as representing the degenerate civic and super-civic types. Till the church of Christ, the devotees of the super-civic wandered in darkness.

As a whole the book is admirable as an introduction to the study of Greek education.

Moderne Mädchenbildung und die Frauenfrage. Von S. DRESSLER. Gotha. 1888. pp. 78.

Both the physical and mental structure of woman point to the home as her proper sphere. Hence in the education of girls—and those of the middle class are specially referred to here—their home-training in the management of the household is of the first importance, and no preparation of studies outside of school hours should be allowed to encroach upon the time devoted to this purpose. In order to furnish such training for girls in the schools as will best prepare them for their future life-work many changes in the present system must be made. In the first place the plan of study must be simplified and limited to essential subjects. Instruction in religion, national literature and history will fit woman to be the guide and inspirer of her family in the love of the best things. In science those branches should be pursued which will qualify her for the intelligent direction of her household. The acquisition of one foreign language, and some practical knowledge of arithmetic, music, drawing and handwork should also be included in a comprehensive course. In the second place, methods must be made more elementary. The teacher should dispense as far as possible with the use of text-books, and by his own thorough familiarity with his subject kindle enthusiasm for it in the minds of his pupils. In the third place the outward reorganization of the schools should be brought about. The people's school should be the primary school of all classes, and the higher schools, natural outgrowths from it, and under the same general management.

The education of girls of the working-classes, though necessarily more limited as to time, should proceed along the same general lines. Their household training will usually be acquired in service, and the responsibility of mistresses in this relation cannot be too strongly emphasized. Their training in the people's school suffers from the

overcrowding of scholars, and often from the inferior quality of the instruction; this latter fact is largely due to the insufficient pay of teachers, and the unintelligent supervision of the overseers, who are too frequently narrow-minded ecclesiastics.

In view of the different training demanded by boys and girls, the question as to the separation of the sexes in the people's schools arises, but on the whole, except under peculiar conditions, the advantages of the present system outweigh those of any other. Where the separation has taken place women are more frequently employed as teachers. While admitting their special fitness to instruct children in their earliest years, the author concludes that "women are neither physically nor mentally equal to the task of instruction in the people's schools, and should therefore only be employed in those branches which cannot well be undertaken by male teachers: the instruction of girls in needlework and gymnastics." C. H. S.

Methods of Instruction and Organization of the Schools of Germany. John T. Prince, Ph. D. Boston, 1852. pp. 237.

The author resigned his position on the Mass. Board of Education for a year, went to Germany, diligently studied schools with an experienced eye, and has at last given us an excellent and well-grouped picture of his subject. Some salient features are as follows:—Boards for higher, are distinct from boards for lower schools. The superintendents in each of the 25 districts of Saxony, and the 36 in Prussia, must look after and report to the Government on the efficiency of the head board, on private schools, prompt payment of teachers, supply books, look after families of deceased teachers. Most teachers examinations require the composition of a choral. All teachers must serve a trial year with very trifling pay. In 1886 only one of all the teachers in all Germany was a woman. Vacations are never over four weeks long; department teaching is more common than here; there is no percentage marking on monthly reports. Each teacher keeps a record of the work of each day, and there are no examinations for promotions, which are made by judgment of principal and teacher. There are very few text-books, and those mostly outlines, containing the barest essentials, the rest the teachers supply. In Saxony the ministry decides on text-books, in Prussia the head and district boards concurrently. Pupils furnish their own text-books, if not too poor. While text-books are few, reference books for teachers are many; and in most schools is a room devoted to apparatus and collections. Pay is small but teachers are exempt from taxes, and from all but 10 weeks of military service, and are pensioned on a scale which amounts to one-fourth the salary after 10 years of service, and three-fourths after 40 years of service. At associations discussions are more concentrated than here upon vital points. There is more out of school study than here, but it is not often hard. Much that our pupils get by study is given by the teachers in Germany. Sarcasm is a more common form of reproof. High school pupils cannot attend theatres or balls or take private lessons without their teachers consent, and parents can rarely visit the schools.

In normal schools no time is given to teaching the subject-matter of elementary schools. Each pupil must learn to play some instrument. Some normal schools have both a graded and an ungraded practice school, and the critic of teaching is severe and merciless. In higher schools much time is devoted to teaching how to study. In lower schools far more science is taught than here, and the topical outlines are often admirable. In all, e. g., physics, the objects and experiments must be demonstrated before the book is studied. The contents of reading books is largely instructive and of higher literary quality than

here. In geography, school excursions, often quite a distance by rail and for some days, are conducted for large bodies of children. The music in lower classes is far more often by rote. Long reviews are frequent; and teachers sit less and teach with greater enthusiasm and have a far larger fund of information. Teachers are appointed and their salaries fixed by central, and not by local boards, so that schools shall not go to the lowest bidders. A separation of classical and real schools, less home work, more drawing and physical exercise, more German, and little manual training, are the practice as postulated. Drawing is rarely from objects. In literature there is much memorizing, much language work, but little technical grammar.

Loyola, and the Educational System of the Jesuits. By the REV. THOS. HUGHES. N. Y., Scribner, 1892. pp. 302. Great Educators' series, edited by N. M. Butler.

The style of this writer is prolix and tedious, his qualification and half-relevant quotations and indirect and slow approaches to his subject almost seem calculated to conceal every salient feature of one of the most interesting, laborously-evolved, effective and original systems in all the history of education. His command of all the chief authorities, and his familiarity with the present working of the system are both obvious, but he is devoid of the art of compact and lucid statement which marks in so eminent a degree the first book in this series by Mr. Davidson. This makes it hard reading. It has moreover no perspective, and there is so much space devoted to parts of minor historical interest that the author seems to write actually with more reference to the controversies past, present, and possible in the future, and as a weary and learned apologist than with reference to the student of education who cares for none of these things and wants to know, concisely and clearly, just what the theory and practice of Jesuistic training is and has been. For such readers this book could be condensed to one-fourth or less of its present extent with great advantage. It would then, if this work were wisely done, give a good, well-proportioned presentation of its subject.

The morals in the great universities were corrupt, and the Jesuits preferred ethical regeneration as the end of education. To this end old principles must be reasserted. Loyola began to study Latin at the age of thirty-three. He lived on alms. Wherever he went later there were outbreaks. His own educational experience had much to do in shaping his system. Chastity, poverty and obedience were lessons taught with severity, and this made the Jesuits superb teachers. For their colleges they chose not the valleys like the Monks of Clairvaux, nor the mountain tops like the Benedictines, nor the rural towns like the Franciscans, but the great cities. They acted in concert, for a man alone they held was as good as no man. Loyola's active life of propounder was but about 15 years. Xavier went to the East Indies on foot, and Aquaviva completed the educational "rule" or code of the order. In 150 years there were 769 Jesuit colleges all over the world. Admission was hard, but there were 220,000 members. Emulation was cultivated by every method. All serial work was obliterated. All classical authors were carefully expurgated, and there was no idleness. All was free from fees. The *ratio studiorum* was worked out in the most elaborate way. Long conferences were held for many years. When at last a consensus was reached, the professor was bound by it; for he was a teacher and not an original investigator. The *ratio* fills 150 pages and was settled at last in 1599, after 15 years of work, and in its ninth edition. It is translated and paraphrased in Kollin's *Traité des Etudes*, 127 years later, as the work of the University of Paris.

The chief end is the formation of professors. The examination of the

candidate must show that he surpasses mediocrity. "Profession" is the first degree of the order. All students must be graded from the standpoint of the teacher. They must teach and lecture under criticism. All studies are pedagogical or magisterial. Prelection, dictation, disputations, frequent inaugural or stated lectures are given. "Nothing is perfectly known till masticated by the tooth of disputation." One disputation is worth more than many lectures.

Die Pathologische Lüge und die Psychisch Abnormen Schwindler, Eine Untersuchung über den allmählichen Uebergang eines normalen psychologischen Vorgangs in ein pathologisches Symptom. Von DR. ANTON DEBBRÜCK. Stuttgart, Enke. 1891.

The author's general standpoint, which he declares almost though not quite universally recognized (e. g., not by Arndt and Fürstner) is that "in practice one meets very many transition forms between the different types" of mental and nervous disease. In particular he holds that there are transition forms between deception which is clearly conscious and intended, and that which proceeds from insane illusion. Everyone may at times detect himself in a "Zwitter von Lüge und Selbstbetrug" (p. 123). This is especially frequent in children. [Goethe's Wahrheit und Dichtung, Buch II; Gottfried Keller's Roman, Der grüne Heinrich, VII Kap.; Kinderverbrechen, Berlin, 1889.] In cases of hysteria one can observe many grades of intensity of the consciousness of intention, from evident simulation to equally evident absence thereof (p. 126). In many forms of progressive mental deterioration, habits of lying, swindling and other forms of deception, grow and become increasingly pathological. The detailed report of five medico-criminal cases illustrating various stages and modifications of this transition makes up five of the six chapters of the book. Other such cases are cited briefly. Daudet's Tartarin de Tarascon is cited as one of many literary characterizations of the liar who only half knows that he is such (p. 55). The practical outcome is that physicians who have to testify in medico-criminal cases should no longer seek to establish the existence of typical insanity and non-accountability or the contrary, but should seek to demonstrate each case as exactly as possible so as to show what if any degree of disease is present; and that jurists should recognize the concept of "lessened accountability." For cases in which pathological lies form the most prominent symptom, Delbrück proposes the name "Pseudologia phantastica." W. L. B.

Die Zuknuft des deutschen Gymnasiums. Von HEINRICH VON TREITSCHKE. Leipzig. 1890. pp. 81.

It has been truly said that the condition of all educational institutions is determined by the requirements of the University. The supremacy of science has led to infinite subdivision of labor and increased specialization. The tendency of our modern life to variety and superficialness of knowledge has also had an effect upon educational methods. Hence in the gymnasium, which should be preparatory to the University and not a substitute for it, the number of subjects studied has been increased to a hurtful degree. The course should be reduced to subjects of prime importance, such as religion, mathematics, German composition, and above all, the classics. The method of instruction should not be dry, special and scientific, but vital and enthusiastic. To simplify the plan of instruction is, however, not enough. The gymnasia are crowded with a number of students, whose sole object is to evade the full time of military service, which can be done by taking a partial course. Only one out of four who enter graduates. The remedy for this would be the requirement by the state of a diploma of graduation from the gymnasium, and also the recognition of a similar diploma from the

Realschule as a title to the same privilege. Both of these institutions have suffered from the fact that their original aims have been lost sight of, and each has tried to do some of the work which properly belongs only to the other. The admission of graduates of the Realschule as students in the Philosophical Faculty of the University was a grave error. The Realschule is to prepare men for special trades, or polytechnic schools, etc., the gymnasium for the University, and it can only be to the advantage of both that each should keep within its own limits. If the gymnasium of the future is to be all that its original aim implied, these reforms must be carried out. C. H. S.

Das Moderne Volksschulwesen in Frankreich. Von LUDWIG FLEISCHNER. Wien. 1890. pp. 41.

The primary school system in France has undergone radical changes during the past eleven years (1878—1889). Four laws of special importance have been enacted and are now in force. The first, that of June 16, 1881, provides that no teacher, male or female, shall instruct in either a public or a private school who has not passed the necessary state examination. The second law, of the same date, provides that instruction in the public primary schools shall be entirely free. The third, that of March 28, 1882, makes primary school instruction compulsory for children from six to thirteen years of age, and also provides for the entire neutrality of the school in all matters of religion. Article 1 states subjects to be included in the course of primary study, and at the head places Morals.[1] The fourth law, known as "la loi sur la laïcité," appeared Oct. 30, 1886. It provides that ultimately only lay teachers shall be employed in all the schools. In a few years this law will be in full force. By another provision, private as well as public are included among primary schools. The budget of the University of Instruction shows that in the year 1887 the entire expenditures for primary instruction amounted to almost 173,000,000 francs; 71,290 primary schools with a staff of 104,765 teachers were supported by this sum.

Advanced primary instruction includes progressive courses and citizens' schools. The former are connected with the people's schools proper. The course is two years in length and is either industrial, commercial or agricultural according to the needs of the locality. In the citizens' schools manual training is obligatory and is now given in 12,650 institutions. There is evidence, however, of a growing tendency in France to substitute for these schools, special trade or business schools. In the seminaries for teachers, special stress is laid upon the courses in morals and pedagogy. These are called "le haut enseignement de l'école." The method of teaching history is especially noteworthy. "General history is only the history of our own land, but enriched, completed and lighted up by the history of those peoples with whom it has been brought into relation. The history of France always remains the starting-point and centre of the instruction."

Three admirable arrangements in connection with the system remain to be noticed. These are the vacation schools for the benefit of children whose parents cannot afford to take them away in summer, the school battalions, and the savings banks. The invested capital in these last represents a sum of 433,876 francs; and the good effect of the habit of systematic saving cannot be over-estimated.

C. H. S.

[1] At the time of the late Exposition, the Minister of Instruction requested information from competent authorities as to the success of this course. Teachers sent in 558 reports. The general conclusion is that thus far neither methods nor results can be pronounced satisfactory.

Das deutsche Strafrecht und die Pädagogik. Von DR. WICHARD LANGE. Hamburg, 1880. pp. 29.

The failure of most of the present primitive and reformatory methods in use in prisons, in attaining the end of bettering the criminal, is an acknowledged fact. The real need of the state is not for more and better prisons but for proper educational opportunities for the children of the criminal classes, which may give them a start in leading upright, honest lives. Preventative, rather than reformatory education, is necessary to elevate the character and reduce the number of those belonging to the criminal classes.

C. H. S.

Anthropological Religion. By MAX MÜLLER. London. 1892. pp. 464.

The "chief object" of these lectures is said to be to show that a belief in God, immortality and future punishment has been gained by the right exercise of reason without special revelation. This Newman had said, and added that most miracles were a continuation or augmentation of natural processes, and thought the supernatural could never be a very high kind of evidence. Man makes and unmakes the miracles that have infected most religions. We are poor Christians if we cannot believe in Christ without the aid of miracles. They always produce scepticism, intellectual dishonesty and distress of mind. In the magnificent apology, lately discovered, of Aristides, perhaps the earliest known defender of Christianity, no stress is laid upon miracles. Those who "haggle" over them are not adults but children still. Neither fetish, totem, ancestor-worship, hallucinations, euhemerism, animism nor mythology can alone explain the origin of religion any more than all the words of many tongues that mean breath, self, dream, shadow, nor the Greek word *thymos*, meaning originally inward commotion, nor *phrenes*, meaning inward organs and then acts, can explain soul. The subject of this volume may be in general defined as the attempt to describe the general growth of a belief in something infinite, immortal and divine in man. It is in a sense also anatheosis, the taking back of human nature into the divine.

Experiences of Flagellation. London, 1885. pp. 80.

These accounts, compiled by an amateur flagellant, are weird and strange. God ordained pain and punishment; and even animals fear it. It is his police department. Not to punish is to keep a boy out of God's school. Hide him and then let him run. Do not low diet or confine him. It is not the pain, but the abatement of conceit and affectation, that kill docility, that is attained. With a man's strength what a frightful monster a child would be! The rod should be used ceremoniously. To spare the rod is to hate the child. Even girls up to 18 have been often greatly improved for life by Dr. Spankster's cure wisely administered. The child idolatry, too common now, or just a little basting with a satin slipper, is very bad. Arnold of Rugby flogged and said it quickened dullards. Let the birch drip again with patrician blood. Knouts, cats, shingles and pilories have done a great part of God's work in the world.

History of Flagellation. ANON. London. 1888. pp. 90.

Much of this interesting material is from the rare work of Abbe Boileau. Their self-inflicted castigations by great men show how deep is the sense of justice. Spartan boys took pride in being whipped in public, and strove who could endure most. Voluntary lashing atoned for sins and appeased deity in Egypt, often in a phrenetic state. Early Christians of many sects scourged themselves, and flaying was a part of

monastery discipline, and was common in nunneries, and many monks and nuns besomed themselves to mitigate concupiscence. Some vowed themselves so many thousand lashes yearly, and these were inflicted with all sorts of instruments, from the heavy thongs to bunches of feathers and foxes' tails. Confessors sometimes assumed flagellatory power over their penitents, and kings and emperors have ordered their subjects to scourge them. The public processions of flagellants, 1760, excited fanaticism wherever they appeared.

Die Wiedergeburt der Völker. Dr. Med. ALF. DAMM. Wiesbaden. 1892.

This is a new monthly journal devoted to the hygienic regeneration of nations. The cultured races of the present are in a state of degeneration. This is caused by an hitherto unknown disease. The regeneration of the nations must be based upon a new idea of life and the world of thought and action. Assyrians, Egyptians, Greeks and all the rest developed gradually, mentally, morally and physicially up to a certain point and then declined. Now England and Turkey show least physiological degeneration, Spain little and Norway none at all. Patriotism and hygiene are henceforth one. The cause of this "cultured disease" is a derangement of the functions and habits of reproduction. The author is an antagonist of Koch, and in a previous two-volumed book entitled "*Neura*" he has developed his so-called system at length.

Problematische Kindesnaturen. G. SIEGERT. Leipzig, 1889. pp. 79.

Fifteen individual children are discribed in concise pregnant phrases. They each represent a type, as follows: A melancholy child, a child very cruel to animals but naturally sympathetic with suffering in others, a born and persistent star-gazer, a scatter-brain, an apathetic child, a hater of men, a doubter and investigator, an honorable, critical, eccentric, stupid, studious, buffoonish child, one with feeble memory, and one quite blasé; this completes the gallery. Eight per cent of all children, we are told, belong to one or other of the above classes. Such natures with exceptional cases or defect are easily wrecked in the making, and school mechanism is often fatal.

Old English Sports. P. H. DITCHFIELD. London. 1891. pp. 133.

This is devoted to the festivals and pastimes of each month in merry old England, before the manners of the country were lost in those of the town and before the village green and the games and customs that centered in it were lost. There were holidays every month in the year, and adults of both sexes played many and many a forgotten romping game. There was tag, mumming, sword-dancing, skittles, hunting of many sorts, and fishing, also a craft-sport, carnival at shrove-tide, archery, etc. Each time, and each county, had its own fit sports, and often a monopoly each of its own. Hundreds are obsolete. Some at first harmless have degenerated, and been abused; but despite plagues, wars and famines, or perhaps because these teach men to appreciate remission of them for a space, England was merry.

The King's Book of Sports. By L. A. GOVETT. London. 1890. pp. 140.

This is the story of the famous declaration of King James I. permitting dancing, archery, may-games, running, leaping, etc., on Sunday after church. These were permitted especially to people who had been to church in the morning. Fairs, wakes, bear and bull-baiting, and interludes were forbidden. For many generations the book excited great discussion and was bitterly opposed by many of the clergy.

Student Life at Edinburgh University. N. FRASER. Paisley. 1884. pp. 185.

This is a fairly interesting story of the written university history, and gives an individual picture of Scotch student life.

The Child and his Book. By E. M. FIELD. 1891. pp. 336.

This is a brief history of children's literature in England, and is illustrated by a few wood cuts and many extracts. The older the world the more interest in children. Children want heroes and not portraits of themselves. Stories about children, discriminating and directing their acts and traits, interest parents but are abominations for children, and cause self-consciousness, and destroy the best that is in childishness prematurely. Even fairy tales are a good thing. The survey of school books begins with Boethius about 500 A. D. and comes down well into the present century. The fluctuation in fashion from horn-book and chap-book to *lese-machine*, and from extreme realism to pietism are striking. The historical survey is wide, the studies from original sources, and the book should be in every pedagogical library.

Stato del personale addretto, alla publica Instruzione. Roma. 1890. pp. 474.

This contains the names of all persons connected with universities and secondary schools with their title or orders of nobility arranged by institutions and indexed alphabetically at the end. The minister of education, Boselli Paolo, has had 39 predecessors in office since 1847, and the present secretary general, Marcotti Philippo, 42 predecessors since 1847.

Grundzüge der Bibliothekslehre, etc. Von DR. A. GRÄSEL. Leipzic, 1890. pp. 424.

This is a systematic, illustrated book by the librarian at Halle upon Library-keeping. It begins in a characteristically German way with searching the idea of a library, or library science, general and special, or the literature in libraries. Then follow chapters on buildings, with many plans, officers, funds, care of books, binding, cases and shelves, use, cataloguing, etc.

Ueber Mittelalterische Bibliotheken. Von T. GOTTLIEB. Leipzic, 1890. pp. 520.

This work, published with aid from the Royal Academy of Science at Vienna, gives a very interesting and full account of medieval libraries.

Petit Guide Illustré au Musée Guimet. Par L. D. MILLONÉ. pp. 252.

At last we have an admirable little guide, by its curator, to the vast collections of the Musée Guimet devoted to the comparative study of religions. The book is copiously illustrated. It will interest educators to know in this connection that the Smithsonian Museum at Washington has begun a collection of objects illustrating Jewish worship, a subject still thought too hazardous by the administrators of the Musée Guimet, and is considering a collection illustrating Christian worship.

Tu Seras Soldat. Par E. LAVISSE. Paris, 1889. pp. 311.

This is a most admirable little school book, with 200 wood cuts, with maps, and a lexicon of technical terms. It is a text-book of morals and patriotism in the form of the history of a French Soldier's Bandry. It is a combination of technology of military orders, camp-life, fortifications, weapons, tactics, strategy, geography, map-drawing and actual history in the form mostly of incidents of the war of 1870, and interspersed with stories, poems and declamations, all as unique as it must

be effective. Flags, rations, bivouacks, the parts of guns of all sorts, the art of explosions, fortifications, military transportation, conscription, discipline and military trials and punishments, medical tests, ranks, fencing, the manufacture of powder, hospitals, sentinals of war, ballooning, all about the navy, and military schools—all these things are so well brought together and so well told that it is no wonder that the book has sprung into a strange and sudden popularity.

Les Ecoles au Moyen Age. Par F. LAGRANGE. Bruxelles. pp. 109.

This illustrated and popular book states that the early medicinal schools were largely the refuge of vagabondism. Types of students are described with the long hat, banjo, sword, book, scrolls and inkhorn, ready for any adventure—to beg, make love, teach, sing, or to exploit superstitions by selling enchanted pills, prophetic calendars predicting eclipses, showing relics, discovering hidden treasures, telling fortunes, curing diseases, conjuring, saying prayers for souls in purgatory, selling amulets, casting horoscopes. Culture had great power to impose on the masses. Popes and kings heaped immunities and privileges upon the early universities. A life of favors and liberties, involving exemption from debt and even crime, was developed, and a fever of intellectual activity arose. Many barbaric students' pranks are recorded, and the book concludes with the well-known story of Platter.

M. FOUILLÉE, in his admirable volume *l'Enseignement au point de vue National*, holds with Guyau that, given the hereditary good and bad points of a race, education can modify existing heredity. He defends the classics, an elementary but complete syllabus of moral and social science, as "the only solution of the educational problem." This would give the ethical training which is especially needed where theology is losing ground. Such a syllabus would be a good substitute, he says, for the catechism.

Guide Pratique des Musées Scolaires. Paris. pp. 145.

This tells teachers and superintendents how to compose, organize and instal collections of any kind for school use. The principle everywhere in France is that the chief use of these collections comes from making, rather than from having them. "Never buy, but make your collection," is its motto. We are here told what to collect, how to name and place and preserve it, methods of labeling and of using.

Enfants Mal Elevés. F. NICOLAÏ. Paris, 1890. pp. 530.

Education is the only science without principle, says this chatty book, so far as children's individualities have nothing in common, and this is very far. First come nine portraits of children, badly brought up, at as many ages of life, floridly and very hastily drawn, and suggesting an effort in the direction of Holbein's Rake's career—scratching, biting lying, passionate, disobedient, insolent, dirty, selfish, cheating at lessons, hypocritical, obscene, lazy and later vicious, shiftless and perhaps criminal—all of these traits are ascribed to too great indulgence on the part of parents, bad education, compromising a series of generations. Among the petty perversities of domestic education are comparisons of one child with another, unfulfilled threats and promises of rewards, deception, irony, satire and mockery, undue humiliations, too constant watching, flattery, excessive familiarity, instruction or admonition below the child's level, ill-considered moral regimen, partiality for one child over another, monologues, e. g., "he would try the patience of an angel," he does just the opposite of what you wish," etc. The natural history of the diciplinary effects of each of these, and of timidity or rashness, or severity on the part of parents, would of itself be an

interesting study. Authority succeeds with far more children than persuasion, and should precede and prepare for it. A regime of authority can never follow one of sentiment. Wills must be broken to grow straight. None are *innately* incorrigible. Those who are made so are not by neglect, but by wrong treatment by parents, so that ignorant painstaking is worse than none. Punish rarely but severly, and avoid too much or long impression. Make no compromises. Do not buy obedience. Punish consistently and the same for the same act. Do not give too much advice, nor be too precipitate. Never give up, avoid states of chronic hostility, and whip severely sometimes if you love your child wisely; delegate no authority to domestics. A history of the whip and physical punishments is suggested, and also of parental authority before the law; so too, the eye in education, the influence of gaiety and laughter in education, children's ideas of happiness, credulity, idiosycrasies, jealousy, *l'enfant terrible*, prodigies. Ignorance is better than bad (i. e. atheistic), science. Precocity and timidity need further study. This book is profusely anecdotal, and light, but not without suggestiveness.

Address of Hon. J. L. M. Curry, General Agent of the Peabody Education Fund, before the General Assembly of Louisiana, May, 1890.

We may learn profitable lessons in extinguishing illiteracy from Europe. There it is better known that ignorant voters will ruin a country, and that good soil, climate and other natural advantages are nothing without education. The bonds that tether the south to the negro are indissoluble. We must lift him up or he will drag us down. Without education representative government is a farce and life is not worth living, for every dollar saved in education costs five in prisons and reformatories. Ignorant labor is limited to a few products. There is no diversification of industries. Slaves make no inventions. There is no despotism so great as untaught public sentiment. Education is a debt due from society to children whose nature is "a vast unexplored continent of psychology." It is a levee against an overflow of ignorance, which may become constant, and leave no fertilizing sediment, but only destruction and disease. Public, are far cheaper, more responsible, and in every way better than private schools. The essence of christianity and democracy is the exaltation of the individual and then securing for society the capablilties of the individual soul.

II—MATHEMATICAL.

The Historical Developement of Arithmetical Notation.

By Levi L. Conant,

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Arithmetic as a science is the oldest of all the sciences. Arithmetic as an art is older yet, and its origin unquestionably dates back to the time when the human race was still sunk in deepest barbarism. The modern anthropologist has upon the subject of number made extended investigation among the savage races still in existence or but recently extinct, and has as yet failed to discover a single instance in which the number concept was lacking. It may be limited to the extremest degree, however, the entire number system of a language embracing but three or four words. The Veddas of Ceylon have but two distinct numerals, "ekkamai," one, and "dekkamai," two. Beyond this they count merely by the repetition of the word "otameekai," signifying "and one more," using this expression again and again. The Wiraduroi of Australia count only to 3. For 4 they use their native word for "many," and for 5 "very many." The Puris, the Bushmen and a

few other tribes count only to 2; the New Hollanders, the low forest tribes of Brazil, and others, to 3; the Abipones, the Caribbees, the Galibi, etc., to 4; and a numerous list might be given of the savage races which have 5 as the limit of their arithmetic. Others again count to 10, 20, or 100, the latter being an exceedingly common limit among the more highly developed of the uncivilized races of the world. It should be noted, however, that the number system of a tribe is by no means an infallible index of their advancement in other directions. Certain of the most barbarious tribes of Africa, as the Yorubas, were rendered comparatively expert in numbers through their intercourse with slave traders; and it is even asserted of this particular tribe that among them the saying "You don't know 9 times 9," is equivalent to "You are a dunce." On the other hand the Peruvians, a highly civilized race, knew almost nothing of arithmetic as an art, and absolutely nothing of it as a science. Briefly stated, the method of counting among savage tribes seems to be this; they make use of a small number of numeral words, and anything beyond that is with them "many." Their scale may be "one, many," "one, two, many," "one, two, three, many," or it may extend on much farther than these limits. But their number sense is in general extremely limited, and it is not a common thing to find them able to count beyond 100. In practically all cases, the assistance of the fingers is needed. By this means counting is often done beyond the extent of their number vocabulary, the total being indicated by holding up the proper number of fingers. If the number in question exceeds 10, the toes, or the fingers of a second man are brought into requisition. The development of arithmetic itself is a subject too extended for treatment in a brief review like the present; but there are certain facts connected with the development of arithmetical notation which are of great interest, and which may be stated very briefly. From the rudest, or more properly speaking, the simplest beginnings, arithmetical notation has arrived at its present state of perfection by passing through a number of well-defined stages. This development has of course not been simultaneous all over the world. On the contrary two or more systems of notation may be found flourishing side by side, one in one country, the other in another. Nor are all these stages to be met with in any one part of the world. The different systems of notation are seven in number, and as far as the writer's investigations have gone, no people has ever used them all. Of these seven systems, four are now in common use in different parts of the world, and three of them are found in common use in all civilized countries.

1. The first principle of notation may be termed the natural principle. It consists merely in the repetition of the straight stroke, dot, or some corresponding symbol. By this method 2 would be indicated by two strokes, 11, 3 by three strokes, 111, etc. It is only among the least civilized of peoples that this system is used in its purity. The ancient Egyptians denoted all numbers under ten by the corresponding number of strokes, but with ten a new symbol was introduced. The common Roman system proceeds in the same way, introducing the new symbol at five instead of ten. The ancient Greeks and the Romans both, however, indicated numbers by simple strokes as high as ten. The Aztecs carried this system as high as twenty, but they used a small circle in place of the straight stroke. All races have unquestionably made use of this principle in the period when they were still savages, or in the early stages of their development into civilization. The use of counters or markers, such as pebbles, shells, kernals of grain, etc., and the cutting of notches in a stick, Robinson Crusoe fashion, may be looked upon as variations of this principle.

2. The repetition of strokes, the cutting of notches, the piling up of

pebbles one by one, soon produces a number of symbols so great as to become confusing. Hence, on the telling off of five, ten, twenty, or a hundred, a single stroke was made in a new place, or a pebble laid aside as the beginning of a new pile. Then the same number is again told off by repetitions of the single stroke, and a second record made. This process gives us the additive principle, so often met with in primitive systems of notation. It was employed by the Egyptians, the ancient Greeks, the Babylonians, Phoenicians, Palmyrenes, Hebrews, Romans Aztecs, and indeed, by almost all peoples that have ever emerged from barbarism into the rudest beginnings even, of civilization. An example of this notation familiar to all is the so-called Roman notation, still used by the modern world for many purposes. This system is perhaps the best of its kind ever invented, for it uses independent symbols for 5, 50, and 500, etc., as well as for the multiples of 10. The Egyptian, Phoenician and other additive systems have only the latter symbols; and the Aztec system contains in all only four symbols—those for 1, 20, 400, and 8000.

3. A great advance on the additive method is to be found in the principle which, from the selection of its symbols, is called the alphabetical principle. In this we find the units from 1 to 9 represented by the first nine letters of the alphabet, the tens from 10 to 90 by the next nine letters, the hundreds up to nine hundred by the next nine, if the alphabet contains a number of letters sufficient for the purpose. If not, a few symbols outside the alphabet proper are used. Thousands, and higher denominations still are usually represented by variations of the letters already employed. This system was in use among the Syrians, Copts, Armenians, Ethiopians, and ancient Greeks, and was brought to its highest state of perfection by the last named people. In their system α=1, β=2, but $\iota\beta$=12; γ=3, $\rho\kappa\gamma$=123, etc. By this method any number may be represented by a number of *places* no greater than that required by our modern system, but the number of symbols needed is much greater. Thus, η=8, an entirely different symbol signifies 80, and still a different one 800, while we use but one symbol in expressing the number 888. The Greeks, however, were obliged to use three, writing the number in question, $\omega\pi\eta$. This system is far superior to any other used by the ancients, and is inferior only to the perfect system of the modern world.

4. In numeration we use, with all except small numbers, a system which, with a single exception, has never appeared in any mode of notation. We say "one hundred," "four thousand," etc., but when we write these numbers we do not write the one and then the hundred, or the four and then the thousand. A strictly analagous notation would require us to write five hundred thus, 5-100; eight thousand, 8-1000, etc. Uncouth as such a mode of expression would seem, it is the system actually employed by the Chinese, and it was until very recent times, universally employed by the Japanese. An idea of their system will be given by writing the number 26438 in the following manner: 2-10000 6-1000 4-100 3-10 8. Single symbols are of course used for 10, 100, 1000, as well as for higher multiples of 10, so the actual Chinese method will be seen to be rather better than would be indicated by the above illustration. But the method is unwieldly at best, and in Japan it is fast giving way to the Arabic system. A few examples of this multiplicative system are found mixed with other systems, but they are rare, and the system itself can hardly be looked upon as forming one of the successive steps in the development of notation from the piling of pebbles, up to the Arabic system.

5. An interesting variation of the alphabetical principle already mentioned is the marking principle of notation. It is never used as the basis of a system, but is not infrequently employed in an auxiliary

manner. In this system the same symbol, varied only by the addition of some distinguishing mark, may represent 1, 10, 100, etc. Thus, if a is the symbol for 1, we might let ä=10 and ä=100; if o=8 then ȯ=80, and ö=800. We may then write the following as illustrative numbers: 108=äo: 18=äo; 808=öo; etc. The Greeks used this method with numbers from 1,000 to 10,000, and traces of the same system are found among Roman ruins. An exhumed tablet gives the number 1180600 in the following manner: I $\overline{\text{MI}}$ $\overline{\text{CLXXX}}$ D C.

6. In the early middle ages the use of the abacus, or reckoning machine, was common in Europe, just as it is to-day in China and Japan. From the abacus was developed a principle of notation which may be specifically termed the column principle. For certain kinds of work this method is very convenient, and it is still used in many ways for special purposes. It was much more employed in the early dark ages than at any other period, before or since. The following diagram will fully illustrate the method.

	M	C	X	I
2452 =	2	4	5	2
2006 =	2			6
1060 =	1		6	
450 =		4	5	

7. The perfect system of notation is that which makes use of the smallest number of symbols. The Arabic system is, mathematically considered, a perfect system; and it is safe to predict that it will never be superseded. With a number system formed on 10 as a base the smallest possible number of symbols with which it could be represented is ten. The Arabic system accomplishes this perfectly by the introduction of the symbol for zero, and by the device of place value. The introduction of this device marks a most important epoch in the history of mathematics, and without it progress in that science must have been much restricted. It was a brilliant invention, and can be matched in importance only by two other inventions in mathematical notation—logarithms and the literal notation of algebra. The name, and even the country of the inventor of the place system are unknown. Although it bears the name of the "Arabic system," it was not invented by the Arabs, but was obtained by them from the Hindus. Whether or not the Hindus were its actual inventors, or whether they in turn obtained it from some foreign source, is a disputed point and one which will probably never be fully settled. It is the universal system of the modern civilized world, and it is too perfect to admit of change until number itself shall change.

TEXT-BOOKS IN ARITHMETICS.

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An inspection of the text-books which I have mentioned below brings into prominent relief certain facts respecting the methods pursued in

the teaching of arithmetic at the present time in France, Germany, England, Canada and America. The best American text books of to-day are far superior to those most used in Canada, and, judging from the meagre list of books which I have had an opportunity to examine, the same is true, and to an even greater extent with respect to American text-books as compared with English. The fetters of tradition and prejudice are, in England, very strong, and reform in educational methods gains ground but slowly. In Germany and France, on the other hand, are to be found an educational enthusiasm, a scientific investigation into methods, and above all, educational results which put to shame the best we have yet been capable of accomplishing in America. While German text books in arithmetic are in many respects not superior to those in use in this country, they are as a rule far more scientific. Instruction in the German primary schools is much better than with us, and the foundations of German scholarship are there laid broad and deep. But the best recent text-books in arithmetic to be found in the world are those published in France. In the great educational rivalry of to-day between France and Germany, there is one point in which the Germans freely confess the immense superiority of the French—the making of text-books. So marked is this superiority, that it is perhaps not too much to say that there is hardly a department of education in which French text-books are not superior to those of any other country. To take an example wholly at random, compare Clerk Maxwell's Electricity and Magnetism with Mascart and Joubert's work on the same subject. As a work of profound scholarship the former has made for itself a great name, but considered merely as a text-book it is both absolutely and relatively very poor. The French work, on the other hand, is a model of scholarly clearness and conciseness. In arithmetic the French do not seem to have adopted the Grube method to any extent, but their own method is so excellent that need for reform does not appear to be felt by them. The best American text-books in arithmetic are beginning to rival French works in the same field, but our elementary instruction, particularly outside our larger cities, is so hopelessly inferior to that in French primary schools, that the comparison is almost disheartening. With the better class of text-books now making their way among us, we may hope for better methods of instruction and better schools as a whole. But the system of local control which prevails in America will render progress slow. As regards methods in arithmetic, no doubt exists in my own mind that the Grube method furnishes the best foundation for subsequent work, not only in that branch, but also in other branches of mathematics. The foundation once laid, any method which is heuristic in its nature may be safely followed. But the one great fact must never be lost sight of, that the teacher is more important than the method. A good teacher can produce excellent results even with an inferior method, while in the hands of a poor teacher, even the best method will be rendered almost useless.

Aufgaben zum Zifferrechnen für Schüler in Stadt-und Landschulen, von A. STUBBA. Bunzlau, 1887.

A series of six Hefte or parts, containing problems only. Each Heft contains sixteen pages, and from 175 to 300 problems. The price of each is 3½ cents. The popularity of the series is attested by the sales which had at the date above given, ranged from 100,000 to 400,000 copies.

Aufgaben für das schriftliche Rechnen, von W. KOCH, Rektor in Berlin. 1886.

A series of Hefte, containing numerical examples. Each Heft contains 25 to 100 pages, and its price is 5 to 15 cents. The editions before me are numbered respectively 485th, 463d, 289th, 230th, 229th and 78th.

Aufgaben zum Rechnen, von A. BOEME. Berlin, 1886.

A series of practice Hefte containing 25 to 30 pages each. Price 5 to 7½ cents. The sale of each Heft has been from 400,000 to 500,000 copies.

Uebungsbuecher in Rechnen, von A. BOEME. Berlin, 1880.

This series appears designed rather for work in closely graded schools, presumably those of some large city like Berlin. They follow the Grube method to some extent. Each Heft contains about 40 pages and 1,300 examples. More than 100,000 copies of some of the Hefte have been sold. Price 8 to 12 cents.

Aufgaben zum Zifferrechnen, Für Volkschulen entworfen, von G. HENTSCHEL. Leipzig, 1887.

A series of practice Hefte containing about 30 pages and 1000 examples each. The different parts have run through from 30 to 50 editions. Price 3 to 4 cents.

Rechenbücher für die Vorschule, von CHR. HARME. Oldenburg, 1885.

A series containing about 2000 examples each. It follows the Grube method to some extent, but not strictly.

Rechenbücher für Stadt und Landschulen von FERDINAND HEUER. Hanover, 1887.

This series is prepared, as far as a series of simple exercise books can be, on the Pestalozzian method. The series is excellent and deservedly popular, the different Hefte having run through from 50 to 60 editions. Each Heft contains 1200 to 1400 examples, and its price is 3¾ cents.

Rechenschule. Methodisch-geordnite Aufgaben zum Kopfrechnen, von G. BERTHEFT und ANDERE. Leipzig, 1877.

An excellent series of drill books; each Heft contains about 1400 examples for mental drill. Price 4 to 6 cents.

Aufgahen zum Zifferrechnen. E. HENTSCHEL. 46te Auflage, Leipzig, 1887. pp. 48.

Contains 1139 miscellaneous examples, covering the four fundamental rules and factoring, together with the tables for weights and measures for reference. Price 5 cents.

Neue Rechenfibel. ERNST HENTSCHEL. 125te Auflage, Leipzig, 1887. pp. 32.

This book contains 3760 examples, designed to accompany the teaching of arithmetic by the Grube method. It embraces sets of examples comprising the numbers 1 to 10, 1 to 20 and 1 to 100. Price 3¾ cents.

Aufgaben zum Zifferrechnen, von G. HENTSCHEL. 43te Auflage, Leipzig, 1887. pp. 48.

Contains 1200 well selected examples and the elementary tables of weights and measures. Price 4 cents.

Arithmetisches Examplebuch für Schuler, von FRIEDRICH KRANCKES. 110te Auflage, Hannover, 1887. pp. 156.

One of the best of the German exercise manuals. It contains nearly 4000 excellent examples, and full tables of weights and measures.

Das Ganze der kaufmännischen Arithmetik, von DR. E. E. FELLER und DR. C. G. ODERMANN. 30te Auflage, Leipzig, 1876. pp. 541.

A German commercial arithmetic, judging from the one before me, is a fearful and wonderful thing. In the early pages of the book devices are given for shortening work in the four fundamental operations; some of these devices are excellent, and some are, to say the least, peculiar. For example, to multiply by 37 we are instructed, p. 6, to multiply by 6 twice, and then to add the minuend to the result obtained. Denominate numbers are introduced almost at the outset, and an exhaustive treatment of fractions, both common and decimal. Ratio and proportion are put in their proper place, immediately after fractions, and then follow percentage, interest, discount, and all the other subjects usually introduced in a commercial arithmetic, each treated with a characteristic German minuteness of detail. Exchange alone occupies about seventy-five pages. But with all the diffuseness noted, the explanations are clear, the examples as a rule good, and the work as a whole excellent.

Rechenfibel, oder Leitfaden und Examplebuch für den Elementar-Unterricht von Rechnen nach der Erfindungsmethode, von FRIEDRICH KRANCKE. 13te Auflage, Hannover, 1881. pp. 111.

A primary arithmetic in five parts. Follows the Grube method. The first part deals with numbers from 1 to 10, the fifth with numbers from 1 to 10,000. Graphical devices are extensively employed. Indeed the special feature of the book is its wealth of graphical material, and, for a Grube text-book, its extreme poverty in examples. For this reason alone it can hardly be considered a successful work.

Lehrerheft zur Ferdinand Heuer's Rechenbuch für Stadt und Landschulen, von K. H. L. MAGNUS. Hannover, 1886.

A series of three parts, each of from 100 to 160 pages, and each published at from 12½ to 30 cents. They treat the fundamental operations and fractions, and follow a method closely analogous to that of Grube. Decimal fractions are treated first as common fractions, and then the decimal notation introduced. An enormous amount of written and oral work is given, and the development of the subject is exceedingly gradual. In the third part, numbers are used up to 10,000,000, and fractions as small as thousandths. Scarcely anything beyond decimals is attempted, the third part making bare mention of the rule of three, interest, partnership, general average and mensuration, and devoting but eight pages to these combined subjects.

Anleitung zum Unterricht von Rechnen, bearbeitet von A. BOEHME. 11te Auflage, Berlin, 1886. pp. 393.

Designed to accompany the series of "Rechenbuecher" mentioned elsewhere. The method is quite similar to Grube's method, but the fundamental operations are begun after the study of the number 20 instead of 100. This work is evidently intended as a basis for a mathematical education. The amount of applied work introduced is exceedingly meagre, more than four-fifths of the work being devoted to pure arithmetic. It is the most exhaustive, and one of the best grammar-school arithmetics with which I am acquainted.

Ausfürliches Lehrbuch der Arithmetik und Algebra, zum Selbstunterricht, von H. B. LÜBSEN. 19te Auflage, Leipzig, 1887. pp. 259.

Almost as bad as a pre-Revolution arithmetic of this country. I mention the book only to call attention to the German method of combining arithmetic and algebra—a method wholly to be commended. Reform in this direction in America cannot be long delayed.

Das Varbundene Kopf und Zifferrechnen, für ein-und zweiklassige Volkschulen bearbeitet, von FRANZ GUTH. Stuttgart, 1888.

Quite different from most German exercise books, and in many ways better. The examples are fewer in number, but are better, and cover a wider range of subjects.

Lehrbuch der Elementar-Mathematik, von HALLER VON HALLERSTEIN. Erster Theil, Arithmetik, Berlin, 1885. pp. 306.

This work prepares for entrance to the Prussian Royal Military and the Imperial Marine. It is an excellent example of the more extended German works on arithmetic, and is a significant commentary on the difference between elementary instruction in Germany and in America. No such work has ever appeared in this country, nor will one like it appear for many years to come. Literal notation is introduced at the outset and is used throughout the book side by side with the ordinary notation of arithmetic. Interest is the only "practical" work introduced, and less space is given to it than to continued fractions; the book is, in fact, an extended treatise on pure arithmetic. It ranks very high among German text books, and deservedly so.

Arithmétique Appliquée, première serie, Arithmétique Appliquée, deuxième serie, par G. BOVIER-LAPIERRE. Paris, 1890.

Problem manuals, containing about 500 and 1000 examples, respectively, taken largely from official examination papers. Price of each 25 cents.

La première année d'Arithmitique, par M. P. LEYSSENNE. Cinquante-huitième édition. Paris, Armand Colin et Cie, 1887. pp. 143.

This book is designed for children of from nine to eleven years of age. In addition to the fundamental operations the tables of weights and measures are taught, being given a prominent place for so elementary a work. Simple geometric notions together with their applications to practical life are introduced. Decimal fractions are given a place among the first pages of the book, while common fractions are hardly touched upon. Multiplication and division are proved, as they should be, by the casting out of nines, a method of which American text-book compilers seem lamentably ignorant. Half-a-dozen pages are devoted to interest, and the book closes with a brief collection of moral maxims upon which the author in his preface takes occasion to plume himself.

La deuxième année d'Arithmétique, par M. P. LEYSSENNE. Quarante et unième édition. Paris, Armand Colin et Cie, 1887. pp. 408.

The fundamental operations are taken up in this work much more fully than in the preceding. These together with numeration and decimal fractions occupy a trifle more than one-fourth of the book. They are immediately followed by involution and by square root. Eighty pages are devoted to the tables of weights, measures and money; and common fractions, scarcely touched upon in the previous work, are here discussed fully. Commercial applications and the rule of three are given a less prominent place than is usual in American text-books. The marked feature of the book is the amount of geometrical work it contains, covering more than one hundred pages, and bringing in besides the ordinary geometrical figures the ellipse, oval and spiral. Cube root, the reduction of common to decimal fractions, greatest common divisor and least common multiple are consigned to a supplement. The book contains 300 figures and more than 3,000 examples, a part of which are taken from the official examination papers of the French schools. This series has been extraordinarily successful, sales having exceeded 2,000,000 copies.

Complément d'Arithmétique, par une Société d'Instituteurs sous la direction de M. E. COMBETTE. Deuxième édition, Paris, 1855. pp. 71.

An admirable little book, containing 1081 examples for practice work. Composition and arrangement of the examples are exceptionally good. Price 9 cents.

Arithmétique, Système Métrique et Géométrie Usuelle, cours élémentaire, par une Société d'Instituteurs, sous la direction de M. E. COMBETTE. Deuxième édition, Paris, 1885. pp. 155.

Unusually good. Designed for the first year of the study of arithmetic proper. Two-thirds of its space is given to the four fundamental operations, which are set forth with characteristic French clearness, and twenty-five pages additional to the weights, measures, and money of the metric system. The elementary notions of plane and solid Geometry together with their applications are given in the latter part of the book. An examination of this and the succeeding work, the *Cours Moyen et Supérieur*, goes far toward showing how it is that pupils in the French schools gain at so early an age such an admirable knowledge of elementary geometry. The work contains 115 figures and 730 examples.

Arithmétique, Système Metrique et Géométrie Usuelle, Cours Moyen et Supérieur, par une Société d'Instituteurs, sous la direction de M. E. COMBETTE. Troisième édition, Paris, 1887. pp. 426.

The two books comprising this course display as their motto: "Faire aimer l'école par un enseignement attrayant et pratique," and never did two elementary text books possess a better right thus to recommend themselves. The *Cours Moyen et Supérieur* contains 3,000 examples, of which a fair proportion are mental. Several hundred examples are taken from the official government examinations. Square and cube root and the rule of three follow fractions. The subjects of Greatest Common Divisor and Least Common Multiple occupy together two pages, while Complex Fractions are omitted entirely. The method of conducting school savings banks, now so popular in France, is explained, and the elements of book-keeping are introduced. A hundred pages are devoted to weights, measures, and money, and seventy pages to geometry and its applications. If the average American text-books in arithmetic were as good as the two in this series, there would be far less complaint respecting the inefficient work done in this branch in our public schools of today.

Traité d'Arithmétique, Théorique et Pratique, par P. PEIN. Paris, 1884. pp. 176.

Designed to cover the work of the first four years. Although written with the characteristic French clearness, this work is far inferior to many of its competitors. It is entirely dogmatic in its method, and gives an undue importance to some of the subjects which are now recognized as of little value for a school text-book, as alligation. A feature of the book is the introduction of the elementary principles of algebra; being of course merely the application of the literal notation to certain of the principles developed.

Eléments d'Arithmétique et de Géométrie, par F. VINTEJONX. Cours Élémentaire. Deuxième édition, Paris, 1884. pp. 108.

Eléments d'Arithmétique et de Géométrie, par F. VINTEJONX. Cours Moyen. Deuxième édition. Paris, 1886. pp. 207.

These two books are thoroughly excellent. In point of selection of matter, arrangement, and method of presentation, they are models. The elementary course contains only the development of the four funda-

mental principles, together with simple notions of measurement and of the use of the geometrical concepts. The intermediate course covers the ground ordinarily found in text-books of that grade, but gives a much fuller application of arithmetic to geometrical figures than might be expected. This is, however, in harmony with the French method of giving a gradual and exceedingly concrete development to the general subject of geometry.

Traité de Calcul Mental d'après la Méthode de Henri Mondeux, par ÉMILE JACOBY. Paris et Brusselles, 1860. pp. 440.

A work of great importance in French school literature. The method followed is inductive, and the work is much more extended than that of Horace Grant or Warren Colburn. Numbers of four figures are introduced and used to a limited extent, fractions are treated quite fully, and elementary notions introduced of ratio and proportion, mensuration, interest, and other topics usually considered beyond the scope of a mental arithmetic. The influence of this work on subsequent French text-books has been quite appreciable.

L' Arithmétique des Ecoles Primaires, par G. BOVIER-LAPIERRE, en collaboration pour le Calcul Mental avec CH. FLEURIOT. Paris, 1889.

Two books of 168 and 288 pages respectively. Distinguished by a large amount of oral work. The text is clear and full and the treatment of the various subjects, particularly of fractions, most excellent. The grouping of all the examples together in the last part of the "cours moyen," apart from the text, is not to be commended. But the course has been very successful, and ranks well among French courses in arithmetic.

Arithmétique Elémentaire, Cours Élémentaire, pp. 136.

Arithmétique Elémentaire, Cours Moyen, pp. 302.

Arithmétique Elémentaire, Cours Supérieur. Par S. MARIE. Paris, 1887. pp. 380.

One of the most recent of the series issued to meet the requirements of the revised courses of study in the elementary schools of France. The Cours Élémentaire is inferior to the other two works, and is not in my opinion equal to some of its rivals. But the Cours Moyen and the Cours Supérieur are fully up to the high French standard of excellence. They contain an unusually full treatment of the metric system and of elementary geometry. The series is accompanied by an exercise manual, Problems d'Arithmétique, which is one of the best problem books I have ever examined.

Cours d'Arithmétique et d'Algebre, par TH. CANONVILLE-DESLYS. Paris, 1886. pp. 505.

Designed for use in the elementary normal schools of France. In point of detail and in fulness of exposition it is comparable to the larger German works on arithmetic, but in system and clearness it is far superior to the best of them. A feature of the work is the space devoted to close analysis. Nearly two pages are devoted (p. 85 et seq.) to the problem: "I have spent $\frac{2}{3}$ of what I had; I have lost $\frac{1}{4}$ of the remainder; I have given away $\frac{2}{5}$ of the new remainder and now have left 8 francs. How much had I to begin with?" Literal notation is introduced in the middle of the book, and the transition gradually made from arithmetic to algebra. For American schools this work would be difficult, but it is in many respects the best arithmetic I have ever examined.

Arithmetic for Young Children, by HORACE GRANT. London, 1861. pp. 135.

Arithmetic for Schools and Families. HORACE GRANT. London, 1861. pp. 350.

These books, now thirty years old, would hardly require mention were it not for the important place they have filled in the history of English elementary education. Their author, Horace Grant, seems to have done a work for English education similar to that done by Warren Colburn in this country. The plan upon which these two books are based is precisely the same as that pursued by Colburn, that is, the inductive method. The author believes and distinctly states that mental arithmetic is of far greater fundamental importance than written arithmetic. Nine-tenths of the work in these two text-books is mental, only enough written work being given to familiarize the pupil with the use of written figures, and to apply with larger numbers the principles previously developed. Little of the lumber with which so many of our more recent text-books have been encumbered finds a place here, the larger of the two books closing with common and decimal fractions and the rule of three. These two little books are constructed on the soundest pedagogical principles, and our text-book compilers of to-day would do well to study them carefully. An American edition of these books has recently been issued by Willard Small of Boston.

A Practical Arithmetic on an Entirely New Method, by JOHN JACKSON. London, 1886. pp. 416.

An Arithmetic on a new method is at any time an object of interest. But the "new method" here heralded is nothing more nor less than the method of the 15th century; the dogmatic method pure and simple. The only reason discoverable for calling this a new method is that the book contains a number of labor saving devices of the same general nature as the ordinary synthetic division of algebra. Definition and rule form the basis of the book, and the practice given is extended beyond all reason. The following examples will indicate sufficiently the unreason which the author displays. "Write in words 100,000,064,000,007,009,000,800,000,700,063." "Find the sq. rt. of 82,447,671,313,860,840,036." "Find the sum of the geometrical progression $5+\frac{1}{7}+\frac{1}{49}+\ldots$ to infinity." In an appendix are nearly 100 pages of Cambridge and Oxford examination papers.

Elementary Arithmetic on the Unitary System, by THOMAS KIRKLAND and WILLIAM SCOTT. Two Hundredth Thousand, Toronto, 1880, pp. 182.

This impresses one as being the work of authors who recognize the shortcomings of the dogmatic method, and who would gladly break away from it, but who are bound hard and fast by the fetters of tradition. The time honored selection of material, order, and method of presentation are followed, but an unusual amount of mental work is given, and in their explanations the authors show themselves to be unconscious believers in the heuristic method. It is the best Canadian textbook I have examined.

A Treatise on Arithmetic, by J. HAMBLIN SMITH. Revised for Canadian Schools by THOMAS KIRKLAND and WILLIAM SCOTT. Eighteenth edition, Toronto, 1890, pp. 348.

This work, which forms with the preceding a complete course, and which is either prescribed or authorized for use in the schools of most of the provinces of Canada, may be described as a marriage between the "rule" and the "reasoning" methods. The old enemies of childhood are all here, even to alligation. About one-third of the book is devoted

to what the author calls Pure Arithmetic, and the remainder to Commercial Arithmetic. While the underlying principle is thoroughly dogmatic, reasoning has been allowed in many cases to supplant rules, and processes have been used which are thoroughly intelligible to the childish mind. As a text book this work is by no means equal to our best American arithmetics of to-day, but it is far in advance of our "written arithmetics" of a generation ago.

High School Arithmetic, by W. H. BALLARD, A. C. MCKAY, and R. A. THOMPSON. Toronto, 1891, pp. 391.

A unique, and in its way an excellent book. It begins with six pages of glossary, five pages of tables of weights and measures, two pages of "powers of certain numbers," and fifty-five pages devoted to common and decimal fractions, developed and explained chiefly after the dogmatic method. The remainder of the book is, practically speaking, devoted entirely to problems, familiarity with working methods evidently being presupposed. The selection of problems is in the main very good, and the book in the hands of a good teacher would form an unusually fine drill book. Some of the problems are rather difficult; and the following, $\frac{\frac{5}{12}\times 6\frac{1}{7}\times 24\frac{1}{12}-4\frac{13}{16}\times 3\frac{33}{34}\div 3\frac{37}{68}}{8\frac{17}{19}\times 54\frac{4}{57}\div 4\frac{15}{57}-7\frac{1}{16}\times 5\frac{1}{16}\div 14\frac{21}{25}}\times 4\frac{5}{23}$, may properly be described as multum in parvo. Price 60 cents.

The Public School Arithmetic. Toronto, 1887, pp. 183.

So good that one could heartily wish it were better. Useless rules and definitions have been minimized, and a large amount of mental work given. It is authorized for and extensively used in the public schools of Ontario.

Primary Arithmetic, by REV. D. H. MACVICAR. Toronto and Montreal, 1880, pp. 160.

This work aims "to train the pupil to accuracy and rapidity in the operations of the four elementary rules of arithmetic, ... and to render him so familiar with fundamental principles and processes as to make advanced work natural and easy." This is at least a hint of the Grube method, and the author seems to understand and to appreciate the importance of that method. The mode of development is good throughout the book, but too much is made of written and not enough of mental work. No attempt is made, as is so often the case with primary arithmetics, to incorporate any except the strictly elementary subjects belonging to text books in arithmetics.

Practical Problems in Arithmetic, for First, Second and Third Classes, by I. WHITE. Toronto, 1889, pp. 60.

Contains between seven and eight hundred well selected examples with answers, but more errors than any text book should contain.

Warren Colburn's First Lessons, by WARREN COLBURN. Revised and enlarged edition, Boston, 1884, pp. 216.

This classic work, called by the author An Intellectual Arithmetic upon the Inductive Method of Instruction, has enjoyed a more widespread popularity than any similar work ever published in the English language, its sales having reached the enormous figure of nearly three million copies. Colburn's method rejects explanations on the part of the teacher, leaving the natural development of the child's mind to overcome difficulties as they are met. No written work is used, but mental analysis of problems is carried to the extent of solving examples of considerable complexity. The edition of 1884 is somewhat more carefully graded than the original work, and is a third or a half larger,

but, contrary to the spirit of the method adopted and distinctly enunciated by Colburn, explanations are in many cases given, and some other changes made which tend to make the work conform rather to the Grube method than to that employed by Colburn.

Second Lessons in Arithmetic, by H. N. WHEELER. Boston, 1890, pp. 282.

This is described by the author as "An Intellectual Written Arithmetic upon the Inductive Method of Instruction as illustrated in Warren Colburn's First Lessons." An "intellectual written arithmetic" is certainly an anomaly. The feature of this book seems to be its omission of "useless subjects and arithmetical terms known only in the school room," and the retention of an abundant amount of mental work. In fact it is a mental arithmetic with a certain amount of written work attached to each subject rather than an "intellectual written arithmetic." It is an excellent work, and fully deserves all the success with which it will meet.

Grandpapa's Arithmetic. A story of two little apple merchants, by JEAN MACÉ. New York, 1868, pp. 142.

An attempt at a "royal road" to the fundamental ideas of arithmetic. It is not quite the Robinson Crusoe arithmetic of the Herbartian pedagogy, but an unscientific attempt along the same lines. Of the merit of his idea and method the author entertains no more doubt than do the most ardent Herbartians of the entire superiority of their system over all others. In the preface he says, p. VI, "If the effort has not been completely successful, I hope some one will be found to make it so, for there is not the slightest doubt that this is the way in which children should be conducted." Educational research since 1868 has hardly tended to confirm this view.

Primary Number Lessons, pp. 149.

Advanced Arithmetic, pp. 288. Compiled under the direction of the California State Board of Education. Sacramento, 1887.

These two books constitute the California state series. They are hardly to be commended as school text-books. The compilers seem to have been under the shackles of the dogmatic method, and the desperate efforts they have made to render that method more "natural" have produced a result which is neither one thing nor another.

First Year Manual and Text-Book of Arithmetic, by J. H. HOOSE. pp. 154. Syracuse, 1882.

Second Year Text-Book of Arithmetic, by J. H. HOOSE. pp. 236. Syracuse, 1890.

The author has given the name "The Pestalozzian Series" to these books. They are excellent, are fully in the spirit of Pestalozzi, and the results obtained with them where they have been tried have been exceptionally good.

The New Arithmetic, by Three Hundred Authors. Edited by SEYMOUR EATON. Fifteenth edition, with preface by TRUMAN HENRY SAFFORD, Boston, 1889, pp. 230.

The most practical of all the practical arithmetics I have ever seen. Textual matter is abbreviated almost beyond belief, and the amount of problem work is very great. It is an excellent working text-book, and has been very successful. The preface by Professor Safford is well worth the careful perusal of every teacher of arithmetic.

The Franklin Primary Arithmetic, pp. 96.

The Franklin Elementary Arithmetic, pp. 144.

The Franklin Written Arithmetic, by EDWIN P. SEAVER and GEORGE A. WALTON. New York, 1878, pp. 348.

These three books constitute the now well known Franklin series of arithmetics. In their treatment of the subject they follow approximately the Pestalozzian idea, and as working text-books they can hardly be given too high praise. The Primary Arithmetic is copiously illustrated, and the method of leading the child along in the development is most judicious. The two larger books are filled with admirably selected examples, and sets of drill tables are given by which the multiplication of problems may be almost indefinitely extended. The success of the series has been phenomenal. As an illustration of the estimation in which it is held by publishers, I am informed that a rival firm, wishing to put upon the market a new series of arithmetics, placed in the hands of a compiler in their employ the Franklin series with the single instruction, "Copy these books as closely as possible." They rival in their excellence the exact, clear cut work which so distinguishes the best text-books of French writers.

First Steps in Number. A Primary Arithmetic, by G. A. WENTWORTH and E. M. REED. Boston, 1890, pp. 158.

Do. Teacher's Edition, pp. 474.

Wentworth's Primary Arithmetic, by G. A. WENTWORTH and E. M. REED. Boston, 1890, pp. 220.

A Grammar School Arithmetic, by G. A. WENTWORTH. Boston, 1890, pp. 330.

A High School Arithmetic, by G. A. WENTWORTH and REV. THOMAS HILL, D.D., LL. D., ex-President of Harvard College. Boston, 1890, pp. 362.

The most scientific and valuable series of arithmetics that has yet appeared in this country. In the elementary development of number the Grube method is followed. The whole of the first year is devoted to the study of the numbers from 1 to 10, but the authors depart from Grube in giving the second year to the numbers from 11 to 20, instead of 11 to 100, the numbers above 20 coming in the third year. The simplest of the fractions are introduced at the outset, on the theory that the fraction presents no difficulty to the mind of the child. The systematic treatment of fractions is, however, wisely postponed as long as possible. The grouping and arrangement of the matter is excellent, and where there has been departure from the order commonly followed, the departure is usually found to be a wise one. The most striking work in the series is the High School Arithmetic, in which we find one feature which calls for special mention. English and American arithmetics have from time immemorial confined their practical applications of arithmetic almost entirely to commercial work. This book, like the best French and German text-books, draws its materials from physics, chemistry, astronomy, etc., as well as from commerce and banking. Altogether the series should, and doubtless will be, epoch-making in the history of elementary mathematical instruction in America.

A New Elementary Arithmetic, pp. 156.

A New Complete Arithmetic, by E. E. WHITE. New York, Chicago, Cincinnati, 1890. pp. 360.

For twenty years White's arithmetics have been a popular series. While not the equal of either the Wentworth or the Franklin series, it

is next to them the best series published in America. In arrangement, matter, and method of presentation, these books are in harmony with modern ideas, and they deserve the high reputation they have gained. But there is just enough lack to make one wish that, good as the books are, they were better.

TEXT-BOOKS IN ARITHMETIC.

By TRUMAN HENRY SAFFORD,
Williams College.

In judging of text-books it is possible to err from too great regard to method. The induction method, or, as its best form is called in mathematical subjects, the heuristic, can very well be employed with a text-book dogmatically arranged; if the teacher is sensible enough to employ the examples and ignore the text, and at the same time is able to replace the text and add to the examples. In such a case the waste is merely of type and paper.

The first set of books I shall mention are English. Rev. Barnard Smith's "Shilling Book of Arithmetic." It "has been prepared for the use of schools at the urgent request of numerous masters of schools, both at home and abroad." The arrangement is dogmatic; the subjects are introduced by Definitions; and, after some mental practice with small numbers, the operations are performed by Rules. The Tables precede the four fundamental operations one by one; Simple Division extends as far as 2828882701578 by 38706. Fractions are taught by Rule not very plainly proved, e. g., the time honored rule for division by a fraction is illustrated in six lines. Here is a sample of the problems:

Work the following bill:—$17\frac{3}{5}$ yds. of calico at $9\frac{3}{4}$d. a yd.; $35\frac{9}{16}$ yds. of flannel at 1s. $9\frac{1}{4}$d. a yd.; $96\frac{8}{11}$ yds. of sheeting at 2s. $0\frac{1}{4}$d. a yd.; $104\frac{5}{8}$ yds. of holland at 1s. $0\frac{1}{4}$d a yd.; and $12\frac{3}{4}$ yds. of ribbon at $8\frac{1}{2}$d. a yd.

On the whole the book is too difficult and too antiquated in its methods.

Rev. J. B. Lock's "Arithmetic for Beginners" is also dogmatic in form, but with rather better explanation of the processes, which are given less mechanically. His "Arithmetic for Schools" is rather more extended, but substantially according to the same method. Charles Pendlebury's "Arithmetic" is larger and the explanations are still more detailed, but the method is still dogmatic. P. Goyen's "Higher Arithmetic and Elementary Mensuration" begins with Factors, Powers and Multiples, and goes on to Fractions. It approaches much more nearly the modern idea of what a text-book should be. Although distinctly intended for the senior classes of schools and candidates preparing for public examinations, it is quite as reasonable in its examples as Barnard Smith's "Shilling Book," and is inductive in method, to its great advantage. The author is inspector of schools in New Zealand. The books so far mentioned are published by Macmillan, except Prendlebury's, which is issued by Deighton, Bell & Co. George Ricks, a London inspector of schools, is the author of two books published by Isbister.

"Elementary Arithmetic and How to Teach It," is a teacher's book for oral work. Quite possibly the pupils would need to have the examples and perhaps some of the other matter printed in a separate form. The rules are given in some of the later parts of the book; but with directions enabling the teacher to properly deduce them from easy examples done by the children. While the book is not strictly according to Grube's method, it approximates to it in its order of early problems; it contains (probably) as advanced methods as can be successfully practiced in the average English schools. Fractions are well developed, but without employing Grube's practice with individual fractions. It is likely that this subject is deferred to a later period in England than in

Germany or America The same author's "Arithmetic for Pupil Teachers," seems admirably adapted to its purpose. In both books Mr. Ricks states the rule for division of fractions thus: "To divide by a fraction multiply by its reciprocal." He points out that if we invert the divisor the figures would be upside down.

Rev. A. D. Capel is the author of "Catch Questions in Arithmetic and Mensuration, and How to Solve Them" (London, Hughes), which seems to be an excellent book for higher classes, within about the same range as Goyen. It needs a good teacher, and is probably most in place for supplementary problems.

Dr. Thomas Muir, of the Glasgow High School, is the author of a "Text-book of Arithmetic for Use in Higher Class Schools" (London, Isbister), which is rather too difficult for common schools. The mathemetical rigor at which the author aims is, in the reviewer's judgement, better attained by what the German's call "Arithmetik" in contrast to "Rechnen"; a philosophical combination of what we term Elementary Algebra and Higher Arithmetic. At the same time Dr. Muir's book is admirable as a reference book for teachers.

It will be seen from what has been said that in England the two older methods of arithmetical teaching—that by rule and that by reasoning – or the method of the 15th century and that of the early part of the 19th, flourish side by side. This corresponds in some degree to the two classes of English common schools; "Church" and "Board" schools. I think the evidence goes to show that the dogmatic method prevails in the country schools of the Established Church; while the "Board Schools" tend rather to the Pestalozzian side. Grube's method cannot but be known in England; but evidence that it is much practiced is not before me. The English currency takes up so great a space in the text-books that we can readily see how much it complicates instruction and thus renders it difficult to introduce the latest methods.

In France, advanced methods are rapidly gaining ground. Bovier-Lapierre explains Grube's method in Buisson's "Dictionnaire de Pedagogie"; and the difficulty in introducing it seems to arise from the relatively excellent system already in vogue. The weak point of the French text-books seems to lie in their scientific character; thus the three primary arithmetics by Combette, Leyssenne and Vintejoux (published by Picard-Bernheim, Armand Colin & Cie, and Hachette & Cie, respectively) begin at once with Numeration, and go on successively to Addition, Subtraction, Multiplication, Division. The result, of course, is that the numerical relations of the simpler numbers are not thoroughly apprehended, in the effort to comprehend the abstractions; and the scholar has to painfully acquire his elementary experience with numbers at a later period.

The French schools have the advantage of a decimal currency, weights, and measures; and vulgar fractions are taken up (in the main) after decimal. It seems quite probable that there should be (in any country but England) two courses of vulgar fractions; one practical, with small denomination, but quite extended and thorough, before decimals; the other more theoretical, after decimals. The weak point in much arithmetical teaching of the present day lies in the mechanical way in which decimals are taught. The French methods seem to the reviewer to err in this respect; partly by the over-use of rules, partly by laying little stress on the fractional side of decimals. If, for example, two decimal numbers are multiplied, the pupil ought to form some judgment what each one really signifies, and about what their product ought to be, to check the pointing off. If the latter is mechanically done the wildest errors may creep into the work.

Of German books, quite a number are before the writer. A few samples may suffice. The most meagre book is that of Stubba, which

had a high reputation in the time of the celebrated Prussian "Regulativ." Like most German "Rechenbücher" it contains little but examples methodically arranged. It is published in Bunzlau, and is manifestly intended for very poor children; the total price of the six numbers of the course is 78 pfennings, or about 19 cents. No. 1 reaches its 85th edition, and No. 6 its 15th by 1887. The number of editions falls off most decidedly after No. 4, which contains simple rule of three; so that the economy for the great majority of pupils is greater. No. 1 claims to have been published to the number of 435,000. The method seems to be Pestalozzian; the directions for the employment of the diminutive books are given in Bock's Schulkunde, a work representing the High Church Evangelicals in the Eastern part of Prussia. There is no doubt that the meagre allowance of matter taught and the conservative and loyal tone of the pedagogy of the Regulatives were admirably adapted to develope that great machine, the Prussian army. One can almost see in the blue covers of Stubba's Hefte and the painful economy of paper in the inside that they are intended for a poor outlying population in training for common soldiers. The Regulatives have gone by, but Bock's and Stubba's books are still republished.

In the reviewer's judgement the arithmetical training needed for practical life is best obtained from examples which are actually of a practical character; while that desirable for a basis to the higher mathematics requires an altogether different kind of examples. In other words a "higher arithmetic" should not be a book taken up before algebra; nor should it be a "commercial arithmetic," which again is desirable for the training of merchants and bankers. The order of mathematical studies in a high school or in a school preparatory for college should vary slightly as to the amount and kind of arithmetic required.

A German book which meets certain of these higher requirements is "Rechenbuch für Gymnasien, Real-Gymnasien, etc., von Christ. Horne et Dr. Alb. Kallius." Oldenburg (Stalling) 1887. Both authors have the title Professor, and are connected with an ober-Realschule and a Gymnasium respectively. The special points of interest are, first, the early treatment of powers, after the four fundamental operations; next, the employment of abbreviations for units, tens, hundreds and so on; again the early introduction of the simplest problems of mensuration; and the excellent grading of the questions for the purpose in hand (the preparation of the boys for the scientific arithmetic of the gymnasia). It is quite too difficult a book for common schools anywhere. There are several German arithmetics, or more properly, books of examples, with which the writer is more or less acquainted; but they are in general not very different.

Grube's "Heftfaden für das Rechnen in der Elementar-schule nach den Grundsätzen einer heuristischen Methode," 6te Aufl. Berlin (Euslie), 1881, is amply sufficient as a guide for the oral instruction which is very common in German schools. With any of the ordinary books of examples, even if their method is not precisely the same, the teacher can give successful instruction in the subject. In America it is hardly possible to employ the German oral method, save in exceptional schools. The German schoolmasters in this country, who begin with pupils more or less familiar with their language, although often "Sprachavin," and whose habits of thought and teaching are firmly fixed in that method can of course do so; and it is quite possible that their methods influence other teachers in their neighborhood. But we have long been under the tyranny of methods of a different kind, and our body of teachers is too fluctuating to dispense in general with a rather elaborate text-book. American arithmetics are mainly such as a good teacher can employ, with judicious omissions, and a bad teacher

can rely upon as an assistant. If, however, the bad teacher is at the same time a mechanical one, the book can usually be made a torture to the pupil.

If we go back a few years, or select for our criticism some of the older books whose stereotype plates are not quite worn out, we shall find much space taken up by definitions and abstract ideas; much also occupied with rules insufficiently explained. As examples of what is here meant, the method of *long division*, and that for dividing one fraction by another, may be selected. Long division is a process of successive subtraction of multiples of the divisor; the proper multipliers must be ascertained by inspection, after long practice in multiplication, the multiplications rightly and intelligently effected, the product, omitting the correct number of zeros rightly placed, and the subtraction effected. Now a rule, or a brief explanation of the process, does no good if the child is already careful and correct in executing it, and is absolutely harmful if it is not. In other words, practice, thoroughly graded, and practice only, is the best help to teaching division; but an incompetent teacher may be assisted by the rule or the brief explanation, and there is some possibility that the same matters may help the pupil in preparing for examination or at a later stage of training in reviewing the elements.

Here is an arithmetic of a generation ago: Robinson's Progressive Practical Arishmetic, first copyrighted by its author (D. W. Fish) in 1858. Each portion of the book introduces quite early a series of definitions, sometimes developed by a little explanation, sometimes not. The definitions are usually quite abstract, and sometimes incorrect. The author shows an example or two, and gives a rule. An experienced teacher would naturally lay very little stress on the reading matter, and treat the book as one of examples; rather costly, it is true, and with too large numbers in many of the examples. I give a few specimens taken at random

Page 7. 1. Quantity is anything that can be increased, diminished, or measured. 2. Mathemetics is the science of quantity.

Page 9. 5th. A bar or dash place over a letter increases its value *one thousand times*. Thus v signifies five, and $\bar{v}$ five thousand. (Roman notation is taught before Arabic).

Page 18. Rule for Notation! Rule for Numeration!

Page 55. Divide 102030405060 by 123456.

Page 163. Reduce 550355068 square inches to acres.

Page 173. Reduce 1116610″ to signs.

Page 174. If a silver dollar measure one inch in diameter, how many dollars laid side by side on the equator would reach round the earth? Answer: 1,577,511,936.

Page 198. Duodecimals.

Page 327. What is the cube root of 27067177703218989 6.

The writer can find nothing like these samples in any German "Rechenbuch" with which he is acquainted. Lack of time prevents the reviewer from extending this notice to other American arithmetics at present; and a historical survey of the favorite older books ought to precede a thorough notice of those now in vogue.

Recent Literature on Arithmetic and Arithmetical Teaching.

By Levi L. Conant, Worcester Polytechnic Institute.

Industrial Primary Arithmetic, by James Baldwin. Boston, 1891. pp. 264.

The best industrial arithmetic that has yet appeared in this country, or in the English language. While it is true to all that is implied in its name, its method is strictly heuristic, and the child is from the very outset familiarized with the relations of the numbers used, as well as

with the numbers themselves. The common, practical things of life, even to the postage stamp, are taught by actual use, but not to the exclusion of the abstract use of number. Simple geometrical concepts are freely employed, adding much to the value of the work. The course laid down is designed to cover the work of the first four years of school life.

The Greek Method of Performing Arithmetical Operations, by John Tetlow. School and College, January, 1892. pp. 14.

Makes no pretension to original research, but merely presents a very condensed review of the method of notation used by the Greeks, and of a few of their most common arithmetical processes. The information it contains is accurate, and the article itself very readable.

Hindu Arithmetic, Science, April 11, 1890.

A brief popular account of certain points in the arithmetical methods of the Hindus. Their nomenclature and their mode of instruction are such as to impart to very young pupils even an extraordinary facility in numerical computation. This is especially noticeable in the case of fractions. The Hindu multiplication table is much more extended than ours, and embraces to some extent multiplication by fractions. For example, separate tables are given for the multiplication of each number from 1 to 100 by $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, $2\frac{1}{2}$, $3\frac{1}{2}$, etc. In some respects the Hindu methods seem well worthy of imitation.

Arithmetic in the Boston Schools, by Gen. FRANCIS A. WALKER, Prest. of the Mass. Institute of Technology. The Academy, January, 1888. pp. 12.

A few years ago the School Board of Boston passed a series of orders respecting the teaching of arithmetic in the public schools of that city, which excited general interest throughout the country and provoked much discussion, pro and con. The reasons for the action are set forth in this article by Gen. Walker in his characteristic, vigorous style. The shortening of the time given to arithmetic, the prohibition of the assignment of work in that subject to be performed at home, the weeding out of subjects believed to be unnecessary and of the so-called "practical" problems, often of a nature so utterly unpractical, are handled by Gen. Walker in a spirit of candid hostility to the methods then in vogue. His arguments are sound and his reasoning unanswerable.

Old and New Methods in Elementary Geometry, by EUGENE L. RICHARDS. Educational Review, January, 1892.

Modern geometrical teaching aims at results; ancient teaching in this, as in other branches of study, aimed at mental training. The former is more complex, because it has at command a better arithmetic than the ancients possessed. But the ancient method had the advantage of making geometry a pure science. The treatment of ratio and proportion is now purely arithmetical—a great advantage. Important propositions are now often given as corallaries, though they often need a demonstration more elaborate even than that given to the proposition to which they are attached. The article as a whole is good, but the author in the discussion of one point falls into the absurdity of denying the right to employ a certain arithmetical process on the ground that the factors used have not been shown to be pure numbers, while in the preceding line he employs the converse process with quantities of which the same statement can be made.

The Mathematical Preparation for College, by TRUMAN HENRY SAFFORD, Professor of Astronomy in Williams College. The Academy, May, 1892. pp. 7.

College teaching of Mathematics is undergoing a great change Young men with special training and with enthusiastic zeal for their work are entering the ranks of college instructors every year, but they find the number of students small who are willing to go on and pursue advanced work with them. Methods have been greatly changed during the past quarter of a century, but there exists a strong tendency on the part of teachers as well as text-books to cling to the methods of the early part of the present century. Colleges must gradually raise their standards because they cannot help themselves, and this must be met by high schools in the same way—by raising their own standards. The poorest work of the present day is to be found in grammar schools, which should give less time to that darling of their hearts, higher arithmetic, and in its place teach inductive geometry and the beginnings of algebra. The Austrian methods are very succesful, and well worthy of study on the part of our educators. It is a mistake on the part of our colleges to confine themselves solely to written entrance examinations. The oral should be used to supplement it. The demand made on the grammar schools must be met by a concentration of mathematical thinking such as has long been employed in the science itself, and in the schools of nearly all other civilized countries.

Methodisch geordnete Aufgaben zum kaufmännischen Rechnen, von M. Löwe. Leipzig, 1892.

A series of three practice manuals in commercial arithmetic, containing 80 to 100 pages each. They are very full and complete, and contain tables adapted not only to German weights, measures, and money, but also the corresponding tables for all the other European countries. The three parts have reached the eighth, seventh and fifth editions respectively.

Mathematische Kurzweil. Von LOUIS MITTENZWEY. 2te Auflage, Leipzig und Wien, 1883. pp. 112.

An extreme oddity among arithmetics, and correctly described by its title, "Mathematical Recreation." It is devoted partly to arithmetic and partly to geometry. A single question from the first part is the following, p. 9: Six sparrows are sitting on a roof; how many will remain if one of them is shot off? Ans. None, for if one is shot off, the rest will fly away. Any teacher who has experienced the wearisome routine of the school-room can readily see what relief an occasional grain of spice like the above might furnish. The second part is devoted to curious and interesting arrangements of geometrical figures, to labyrinths, magic squares, Chinese puzzles, and a great variety of most interesting and, in its way, instructive work. A judicious use of this little book might well assist in the "shortening and enriching" of an ordinary school course in arithmetic.

Die Mathematik die Fackelträgerin einer neuen Zeit. Von E. DILLMANN. Stuttgart, 1889. pp. 214.

Mathematics is the language of languages, the best school for sharpening thought and expression, is applicable to all processes in nature; and Germany needs mathematical gymnasia. Mathematics is God's form of speech, and simplifies all things organic and inorganic. As knowledge becomes real, complete and great it approximates mathematical forms. It mediates between the worlds of mind and of matter. Such are the theses of this loosely-written, vague and incoherent book, which belies every anticipation awakened by its attractive title.

III.—NOTES.

When Seth Low, who was then unexperienced in academic work, became President of Columbia College, in February, 1890, he found it divided into four faculties, each independent, and as he says in his first Report, "almost without any consciousness of the others." No degree could be taken without a complete course in some one school, and if a student of one school wished to take a course in another he must matriculate and pay a fee. Yet some professors sat in two and even three faculties. Standards and practices differed greatly, and from the students' standpoint unification was greatly needed. This was effected, and the President was guided by an advisory council of twelve, in which each of the four schools was fairly represented. Graduate work, which is said to be University work, is in the hands of this council. This led to the announcement of the policy of making under-graduate work incidental to university work, as the seed is for the sake of the tree. "There is," says the president, "no field of intellectual interest which does not now become a part of her concern, so long as there is any branch of human learning in which her facilities are not the best, her facilities will stand in need of improvement." She must contribute something every year to the sum of human knowledge. Her aim should be to give a distinctly intellectual tone to life in a great city. A university can never have enough funds. Those competent must have time for research. Merely to teach what is already known is not enough. The college must be made great through the university. During the first year of the new administration not only were options enlarged by having one matriculation fee, but the senior year could also be made the first year of the professional course, thus shortening by one year the time required for the college and professional course combined, and making the bachelor's degree not the end but an incident to the true goal of a professional degree. This plan has great advantages over the plan at Harvard in connection with the proposed shortening of the courses for the bachelor's degree. A sad showing of the Columbia Report is that the per cent. of students holding degrees in the Law School, the College of Physicians and Surgeons, and still more in the School of Mines, is distinctly less for the decade ending in 1870 than it was before 1870. This report, besides these marked advances, showed that the new president chose his advisers wisely, had caught and combined their best ideals, and what is better yet, had felt something of their glow and promise.

His second Report for 1891 is a record of achievements greater and better than any of our established institutions have been able to show in a single year for a long time, if ever. The College of Physicians and Surgeons surrendered its separate charter and became a part of Columbia College. The union had been partial and only nominal before; now it is essentially complete, and the president even records that the estate of the college is increased $1,652,850 by it. A new department of Biology, with a professor and an assistant professor, is established. The American Museum of Natural History has taken the first step toward what is hoped will prove a federation by appointing a curator from the staff of the college. Plans for a Botanical Garden in which the city shall co-operate are developed. Union Theological Seminary is also to be represented in the Faculty of Columbia, and students of each may take courses in the other. A seventh year away on half pay is permitted each professor, who may also retire at 65 on half pay somewhat like the judges of the Supreme Court. Fellowships cease to be tutorial, and 24 new fellowships yielding $500 each have been established. The law school has been radically re-constructed with a three years' course, discouraging office work during the first two years, opening a broader range of both legal and non-legal studies. "Columbia,"

says the president, "does not propose to level down her work to the demand of those who can give to it but a portion of their time nor to forget that she owes a duty to the whole community." The dean of the new Law School will be under the president of Columbia College. A summer school of surveying is to be opened at Litchfield, Conn., and $200,000 is to come to it from the Fayerweather will. A tone of triumph and exultation pervades this Report. It is a tale of new life, new zeal, new hopes, higher standards, greater unity, and a new character, at once more municipal and more international.

Medical Inspection of Schools.

In 1888 a Scientific Commission, appointed in Prussia to consider the relation of schools to medical practice, reported in substance as follows: 1. In order to secure a wider consideration of the subject of school hygiene it is necessary that medical experts, in greater number than heretofore, take part in school inspection. 2. Such inspection is needed with respect to (*A*) The material part of the school, especially (*a*) in the erection of new school houses, with reference to the site, surroundings, water supply, general plan of the building, arrangements for heating, etc. (*b*) In existing schools, with reference to the surroundings, water, air, light, seats, mode of instruction, cleanliness, ventilation, heating, water closets, play ground, gymnasium. (*B*) With respect to the pupils inspection is required for each, (*a*) when he first enters the school, and (*b*) later, regarding such contagious diseases as scurvy, itch, inflammation of the eyes, tuberculosis, syphilis, smallpox, diphtheria, scarletina, measles, whooping cough, mumps, typhus. 3. Government should in all cases appoint a physician as member of the School Commission or the Board of Trustees. 4. The Inspector should examine and report on the buildings, contents and surroundings once in 3 to 5 years; the pupils each half-year. Except in urgent cases, such as contagious diseases, the physician should simply report to the Principal or to the School Board. Specialists should be called in whenever it would be advantageous to do so. 5. The Inspector should take part with the teachers in school conferences; and he should give them instruction in hygiene in their seminary course.

Among the medical experts on the continent of Europe who have examined this question, and among all educational authorities, there is practical unanimity as to the necessity of frequent and thorough medical inspection of the schools, and there is a very general consensus of opinion that this should be done by a regular physician appointed for the purpose. Writing of the English "Public Schools," Dr. Farquharson, author of "School Hygiene," says, "Every school should be provided with a medical attendant appointed by the head master, working under his direction, responsible to him and to him only, but with the right of appeal to the governing body in case of capricious dismissal." He advises that all inspections be made informally. Dr. Sholz considers that the inspection of pupils should be done entirely by the teachers, who should receive medical training for that purpose. Dr. Löwenthal, while approving of the hygienic training of teachers, considers that additional regular medical inspection of schools is necessary. Dr. Cohn, who has done perhaps more than any other man to bring this matter to the attention of the public, urges the frequent inspection of schools by the most skilful physicians obtainable, and emphasizes this advice by showing that an alarming increase of myopia is a result of the conditions of the children in German schools.

In view of this practical unanimity of opinion regarding the importance of medical inspection of schools, what has been done?

The Belgian law of 1846 required those physicians who had the oversight of poor houses to inspect the schools also. This law applied only

to the schools under government control, which are not more than half of the total number. In 1876, in the city of Brussels, the medical inspection of schools was placed in charge of the physician of the board of health, and this plan has been found very satisfactory. Most of the other cities and towns have adopted a similar plan. In addition to his medical duties proper the Inspector instructs the teachers in hygiene and the early symptoms of diseases so that they may report at once any invasion. Weekly visits are made by the inspectors.

In Paris medical inspection of the schools has been in force since 1879. Each inspector is appointed for three years at a fixed salary, and has charge of a number of schools. He must visit each school at least once in two weeks and make a full report to the mayor of the city. In 1882 departmental physicians were appointed to superintend the work of inspection. Paris now expends annually about 1,000,000 francs for school physicians. Many other cities of France have adopted a similar system: Lyons in 1880, Havre and Nancy in 1886, etc.

Regular Physicians are appointed in Sweden to inspect pupils at the beginning and end of each semester, to treat those who are suffering from disease, to see that those who are myopic or hyperopic are suitably provided with spectacles, and so forth. This was begun in 1878. Under a new law passed recently the duties of the inspectors are largely increased and more clearly defined.

In Hungary a physician must be appointed for each Mittelschule as instructor in hygiene and sanitary inspector. A professor of hygiene is also required by law to be appointed in each university.

The English "Public Schools" have either a resident physician or a regular physician in attendance as inspector of the pupils with particular reference to contagious diseases. The lower schools are subject only to the general regulations of the Board of Health. The same is true generally of the common schools of Canada and the United States. In Boston last year $5,000 was appropriated by the city for daily medical inspection of the public schools; and physicians are appointed for this duty by the Board of Health. Elmira, N. Y., has also medical supervision of its schools.

T. PROCTOR HALL.

Andrew H. Green, Esq., of New York, executor of the will of W. B. Ogden, merits the lasting gratitude of all friends of higher education for his services in establishing the "Ogden School of Science" in the new University of Chicago. It is to be devoted solely to graduate students and chiefly to research, and is to include all the graduate work of the University on these subjects, to have fellowships and facilities for publication, and to be assured absolute freedom from religious discriminations. The response of the University was prompt and hearty, and Mr. Green's letters defining and determining the character of the school indicate with great clearness the line of the chief need of higher education in this country.

Mr. Bryce says in substance, that, modestly as Americans are wont to speak of their universities, some of them are already beginning to rival those of Europe and will soon have more funds at their command, and already have more ardor and interest, are making the swiftest progress and are contributing exactly what the country most needs. Provost Pepper lately added in substance that they are public charities administered most economically and in the sole interest of the community. He adds "there are half-a-dozen Universities to-day in America, each of which could spend with infinite advantage to the nation an annual sum of $10,000,000; and I cherish the hope that, ere another century has passed, there will be more than one whose productive property will be

fully $100,000,000. That this hope is not chimerical, the magnificent benefactions of the present day demonstrate. The more Colleges and Universities we have the better. There is work for them all, and there is money enough to endow them all richly. Let each strive hard for the attainment of the loftiest ideal it can set up. Different as their development must be, they will all at heart be one, and will all be loyal to the common cause. But I confess that the splendid system of American Colleges and Universities will seem to me incomplete until we have at Washington a great University, free from political as well as from denominational influence, and representing, if not actually administered by, the leading institutions of the land. Just as the ideal individual University may be viewed as an aggregation of many colleges, and a federation of all kindred institutions accessible; so I hope to see, as the ideal national University, a University of Universities formed as the central government is formed, by the federation of many independent institutions, planted strongly at the capital of the nation, using the unequaled collections which are growing there for the prosecution of the highest studies under the most eminent masters, and proclaiming to the world that, among the ideals which we Americans hold by, is that of education, thorough, pure, and free, from the cross-roads district school to the groves and halls of the loftiest University."

Koch's new Institute in Berlin has a staff of scientific workers consisting of two overseers, four assistants, three voluntary assistants and quite a number of independent investigators. Only those are admitted who are thoroughly acquainted theoretically and practically with the principles of the doctrine of infection, and are able to carry on their work independently. Whoever enters the Institute must sign the following agreement: "The undersigned hereby agrees to give over to the Board of Directors of the Institute the disposition of the results of his work at the Institute for Infectious Diseases at Berlin, and accordingly to submit his work, before publication, for approbation, and on leaving the Institute to make the necessary statements concerning the results of his work accomplished up to that time, and to give over to the Directory Board all the notes and records concerning the same." Weekly conferences are led by Dr. Koch, where the opportunity is given to gain an insight into the works as a whole. There is a close connection between the scientific and the hospital departments; the staff of the former is always represented at the daily visit by the bedside. The autopsies, almost without exception, are made by Dr. Koch. Blood tissue, humors and organs are studied microscopically and bacteriologically, and experiments on animals follow, in order to elucidate thoroughly the case in hand.

Prof. C. M. Tyler in his inaugural address as professor of the history and philosophy of religion at Cornell takes a large view of his work. He is first a christian with a faith that nothing can imperil. The "Fall of Man" was upward. Primal innocence was that of an undeveloped being. There is a progressive and infinite purpose, yet religious truths are to be interpreted immanently and not transcendentally. Love of nature and communion with her brings a sense of spiritual presence, as though nature begged redemption. The higher criticism has come to stay. Everything has developed, but all is watched over by God. The present Teutonic revolt against the religion of the Semites will not succeed. Many who are interested in the commendable step of creating such a chair will be interested mainly in the incumbent's theological position. The inaugural is compatible with any christian creed. This is well. The point of chief importance, however, is not his theology but whether a man who throws his cestus into this vast and rapidly widening field,

which in the best foreign centres requires a number of men to cover it, has that thorough, extensive and technical scholarship which only long and arduous apprenticeship can give and without which little can be accomplished.

Dr. I. Comby, who has observed nearly 40,000 diseased children in the last seven years, in his admirable monograph on the diseases of development, says country children pass through growing fits with far less danger then city children, and that the sedentary indoor life of school increases this danger for both. Sometimes, especially after fevers, growth is so rapid, especially in height (chiefly at the lower epiphyses of the femur) that the integument shows the white lines seen in pregnancy, indicating the inability of the skin to keep up with the rapid elongation of the skeleton. In very rapid growth children are more vulnerable to contagious diseases and to pulmonary phthisis and tend to temporary organic deterioration. There are osteoscopic pains, exeostosis, sometimes tumors, tarsologia, especially if too hard physical work is required. If muscles relax and lose normal tenacity they cannot resist articular deformities and scoliosis bred by too infrequent change of posture. Almost all diseases affect the heart secondarily, and it may become irritable. There is the "fever of adolescence," and a "headache of development" with errors of ocular refraction. Children then became impatient of all rule and restraint. Food should be individualized and tastes consulted.

The miser represents a distinct type of psychic disease, and with his antithete, the spendthrift, well merits a distinct place in psychological pathology and as careful and detailed study as the kleptomaniac or any species of paranoiac. His love of money is for its own sake and not for its uses. It may result from a morbid fear of starvation, which in many cases is so great as to lead to slow starvation to increase his hoard. Prodigals sometimes become misers, but no miser ever becomes a prodigal. His moral disease is mental; no amount of money cures the miser's thirst for it. Avarice hides and is therefore hard to study. The substitution of paper money for coin has reduced the miser habit. It sometimes seems to originate in nervous timidity, and frugal habits slowly pass to niggardliness. It is usually attended by more or less weak-mindedness. Sometimes misers do generous things by fits and starts. Sometimes they deal well with large sums and are misers only with small sums, and some are misers only in one or more particular lines of expenditure, as e. g., food, while they are lavish in dress, in furniture, while living in expensive houses. C. Redding has collected the records of some scores of these remarkable beings in two volumes of memoirs.

America is said to have 441 institutions with the "right" to confer degrees. There is no uniformity. It is desirable to place as many men as possible under obligations to an institution. Degrees bring in money; they induce men to study. Degrees "as good as any the country affords" are offered non-resident students for a moderate fee. These "courses" are often only a list of badly chosen books for reading. Non-resident students with a degree are often ranked as alumni, and in a few institutions from 20 to 50 per cent. of the students whose names appear in the catalogue are non-resident. It is beyond the province of the ordinary college to give the Ph. D. degree. The Iowa teachers, association has finally committed itself against degrees without residence.

The new $800,000 observatory in Washington is now approaching completion. Some fear its massiveness may produce atmospheric effects that will impair its usefulness in the summer. A bill was introduced

Jan. 18 to provide a better organization of its scientific staff. If the bill passes, this will consist of a director at $5,000, a chief assistant capable of taking his place on emergencies at $3.000 with three scientific assistants, and an advisory board of visitors. Some reconstruction is greatly needed. The scientific publication is now nearly five years behind the observations, and one astronomer speaks of the present observatory as "an astronomic mob, sometimes successful in obtaining the most brilliant results by individual prowess but always lacking in co-ordination of work and wasteful of effort."

The *Sunday Review* would keep Sunday free alike from ordinary labor and from extreme sabbatarian strictures. Museums and galleries should be open as well as all places of rational recreation and instruction, especially after two o'clock P. M. All the highest educational influences should be at their best on that day. In the 14 years of its existence it has done admirable pedagogic work.

Two magnificent palaces, exactly alike, each 169 x 69 metres, were finished in Vienna in 1886. One is a Museum of Art and one of Natural History. The four stories of the later are devoted to Minerals, Zoology, Botany, and prehistoric Anthropology and Ethnology.

The scientific literature of fatigue seems likely to be equalled by the popular literature of rest-cures and theories. The body must work economically with no irrelevant tensions or secondary flaccidities. "Americanitis," for nervousness and exhaustion prevent the spine from "giving" to the bed with complete passivity, the tongue or throat or face muscles are contracted, and it requires much watchfulness to relax useless strains. Study and practice how to relax entirely, to "let go." We do not give up to the motion of the car or carriage or ship which therefore produces tire. A sharp turn or jolt "tenses us up," we brace up, press the floor with the feet. Many use throat and jaw tensions in thinking, sometimes legs, arms or hands. Reading is rarely pure. Hearing speakers or vocal music makes us hoarse next day. Thus the body ceases to be free and our very personality grows contracted. Extatic excitable people work themselves up and grow very tired from seeing and conversing with others. Some women habitually sew with the "back of the neck," and feel fatigue there, some must try to hold themselves together, and their walk or work is unnatural and handicapped by over tensions of muscles. Skill partly consists in getting rid of embarrassing tensions. Few pains are better borne by bracing. We must relax in the dentist's chair, relax to a cold and not fret about it, avoid too great sympathy with others who suffer, also all exaggerated, unnecessary or sham emotions. A reputation for extraordinary sanctity, magnetism, *abandon*, or "dry drunks," straining to do right, petty worries, over-sensitiveness, egotism even in suffering is bad. Let yourself go and avoid contradicting. Rest must be trained for. Lie flat on the floor and give your weight all to it, practice dropping the limbs, and an elaborate cult of passivity is prescribed. Let all the body press the floor as the breath is exhaled. Think each limb very heavy, be a bag of loose bones. Have it tossed and caught till it ceases to be tightened up like a lively eel. Such drill will enable the human machine to use a larger part of its fund of energy. Then by poising, "freeing" and tossing the limbs motion is taught, and by guiding the muscles we learn to guide the mind. A training for concentration of mind must begin with the muscles. There are three dramatic schools, the hysteric, the hypocritical and the sincere. Equilibrium between the outer and inner is the end of the last only. The rest-cure is a gymnastics for the nerves, that trains and strains not. In the gymnasium, face and other limbs must be watched to ensure

true economy of force. From limbs pass to the body. Be passive while being lifted or rolled over. When exhaling be limp as a rubber bag, and lay down as if each vertebra were a bead on a string. Learn to lop the body and flop the hands, and bob the head. Be flaccid, flabby, absolutely passive, inert, and lo! the rest-cure has done its work.

Apropos of what was said in the PEDAGOGICAL SEMINARY, Vol. I, No. 2 of adolescence as the period of special interest in religious matters, statistics collected some twenty years ago by the Rev. Christopher Cushing are interesting. He collected records of the personal experiences of 380 persons, (128 males, 252 females) who were admitted to his church during a ministry of 20 years. Their average age when joining the church was 25 years, that of the male 26, that of the female 24. 163 joined the church between the ages of 11 and 20; and 142 between 20 and 30. Only 38 joined between the ages of 30 and 40; only 22 between 40 and 50, and only 15 at a later period of life.

President Angell of the University of Michigan in his report for the year ending September, 1891, reviews the progress of the twenty years since he became president in a way which shows remarkable growth. About one-half of the studies prescribed for graduation are now elective. Since 1871, voluntary has taken the place of compulsory prayers with satisfactory results. Students enter a year younger than twenty years ago. The well-known "diploma" relations has grown from 5 to 82 schools, some of which are outside the state. Every State from Ohio to California now has a State University. The great Universities of the West and South are likely to be those established by the State, Michigan has to a great extent set the fashion and led the way.

Can any of the results of education be transmitted by heredity, or has education any value for the next generation apart from its influences in the way of teaching and environment? This is the question raised by Weisman, the Freiburg biologist, who denies that any "acquired character is transmissible." Galton in his "Hereditary Genius" had leaned towards this conclusion, so had Candolle and Wallace. Talent often persists in certain families, but are faculties improved by exercises through a long course of generations? If all talent arises as "sports" or "freaks" or as surplus products of leisure, then education can benefit only the generation receiving it, and we must profoundly reconstruct our theories of education, and of social reform.

David Swing, says all the true uses of Sunday fall under the head of education. The Puritan, Catholic, European, Hebrew and other Sundays have not solved the problem. The best men must now unite to discover what kind of a Sunday will be best for man; how many parts physical rest, how much commune with nature and art. Thus a Sunday must be developed which shall be best for muscles, health, intellect, and shall be most truly American.

The elementary or "propadentic" of philosophy which used to be taught in German gymnasia, in close connection with German literature, is declining there. The method here was and is at first the socratic dialogue. Acuteness rather than breadth was sought, and of of late it has been introduced by a little book work on the physiology of sensation. It is often used to oppose materialism and indifferentism. Paulsen thinks the elements of the history of philosophy the most important to form the mind. The number of introductory text-books in every field of philosophy, the many series of "classics," each epitomizing a leading philosopher. the abstracts, catechisms, outlines, are very many; Lehmann, Pietzker, Elsenhaus, Gross, Höfler, Pommer.

Ziemssen in a valuable article on the relations between clinical instruction and the practical education of the physician, pleads for a fifth year, and for the institution of voluntary doctors each having a well-defined responsibility for fixed days. This plan has worked well for some years in the woman's clinic of Munich under Winckel. After taking his degree each young doctor should have some such opportunity where he can gain some experience in each class of special diagnoses.

The proposed University of Wales is to be a teaching and a non-political body. After much discussion of the question it was decided that residence at one of the colleges of the University should be necessary for a degree.

The number of students who matriculated in the 21 Universities of Germany last fall was 28,515, of which the largest contingent—8916—were students of medicine.

F. Tönnies thinks penal law in all lands is on the verge of collapse. The idea of punishment as inflicting pain and injury is about to be abandoned, and punishment is to become judicious treatment. Reformation is so rare that no habitual criminal should ever be released without retaining some hold upon him. Compensation to the injured party should have prominence. The more we know of the criminal the more does retribution pass into pity.

Mosso would reform athletics in Italy by freeing it of tedious pedantries. Abnormal power of muscles impoverishes other organs. The former habituate themselves to poisonous products of waste. Symmetrical is better than local fatigue. German gymnastics are somewhat preferable to Swedish as being less intense. The most successful commission to reform gymnastics was the French. The eclectic course elaborated by this commission is mainly military.

Half the Grammar schools of Boston now have no recess. The plan is said to protect health and morals. Children reach home earlier and can help get dinner, etc.; there is less matter of discipline and large school-yards will henceforth be unnecessary. The superintendent entertains "grave doubts" about the no-recess plan. It is an hygienic outrage, and very deleterious in its effects on the nervous system. Are children never to have effective medical protection against the *morbus pedagogicus?* How to divide the school day may be an unsolved problem, but every physiological hint points to more and not less frequent intermissions.

Supt. Seaver desires more detailed courses of study which may be different for different high schools; daily time tables; more new, outside talent in the teachers appointed; when a mastership is vacant he would have all sub-masters in the city regarded by the board as candidates; more visitations in the rooms of doubtful teachers; claims great improvement in language work since 1845 as shown by examination papers on file; recognition of age and maturity apart from scholarships as a basis of promotions which ought to be as numerous in the middle of the school year as at the close. When both the higher grammar classes were allowed to try the high school examination nearly as many in the next highest as in the highest class passed.

Flogging in schools is forbidden in New York City, Philadelphia, Chicago, Cleveland, and many other cities. It can be inflicted only by principals or masters in Brooklyn, Albany, San Francisco, New Orleans and others, while in Boston it is applied by teachers generally. The result was that over 18,000 children have been flogged per year in

Boston. Much of this is no doubt due to bad digestion and bad nerves and to uncivil manners of unfit teachers, and the superintendent says he has no means of knowing the names of the teachers who whip unnecessarily. No good teacher *depends* on flogging. Boston masters are now trying to teach their teachers how and when to flog, and Supt. Seaver proposes a few parental or disciplinary schools for troublesome boys, and for incorrigibles.

Laws requiring school attendance cannot be enforced till there is a public record of each child's birth. In European cities police records show this.

Brander Mathews in the *Educational Review* says, English literature can be taught but cannot well be examined on, and that Mr. Collins and Mr. Lang are both right. Narrowness, not breadth, is now being produced by subordinating literature and philology. This is why Greek is falling off. The two are not only different but so opposed that one who can profess one usually cannot profess the other. One is scientific, the other artistic. Many things greatly needed for personal study are not fit for examinations. We cannot yet examine in tastes and sympathies. There is too often stress laid upon futilities, upon foot-notes that are drearily pedantic, and men conceive literature as a peg on which to hang examination papers. The French teach their literature better. Like all teaching, the teaching of English requires constant delicacy, tact, enthusiasm, abundant knowledge. The instructor must recognise, at the outset, that many are congenitally blind to its charms and will remain so despite all his efforts.

President Hyde suggests as a cure for impending paganism in New England that the broader men in all denominations in small towns unite in complete disregard of denominational lines, form a church and call a minister solely on his merits as a leader of men in spiritual life and work. Men and women in and out of existing churches should unite, and would attract as preachers the best talent in and out of existing pulpits. Such a movement would revolutionize the religious state of our country towns in twenty years. Paganism or this is the alternative so long as the church is so narrow, dry, and sectarian. Only the agricultural class possess permanent vitality. Without reinforcement from this source any city community would die out in four generations. The problems of rural christianity are national. Now these communities promise to be the first to lapse from vital christianity. Most inherit a church quarrel or scandal, the churches are poor and often supported by clubs of women, pastorates are short, there are dislikes between villagers and farmers, pastor and people are in a state of more or less chronic surpressed discontent with each other. Preaching is transendental and unpractical. In sermonizing God is regarded chiefly as the publisher of certain ancient books. The best man is he who practices the most daily virtue. Men must associate, for one man alone is no man. Armed neutrality between denominations in the same town is not enough. They should unite to study the entire religious and moral geography and economics of the town. Village improvement, social reforms, charity, and co-operation should be taught in theological seminaries. The real line of demarkation is now not between sects, but between the broad and narrow men in all denominations.

F. H. Sargent, director of the Lyceum School of Acting in New York City, has leased the Berkeley Lyceum (seating 300 people) for a "Higher Independent Theatre." It has an executive committee of 200, an advisory board of 50, including men prominent not only in stage-craft but in letters, art and music. No tickets will be sold to the public or

given away even to newspapers. The object is four fold. To give plays important in the historical development of the stage; to encourage untried works of merit by unknown men; to give each an adequate. artistic setting, and supply the lack of a classical repertory. Plays must be by American writers or must treat of American life. Other theatres can thus see untried plays, and must aid by the loan of scenery and properties, but the aim is as much to find plays of literary as of dramatic merit. An adaptation of Brander Mathews' Ralph Royster Doister; Tyler's "Contrast," the first play by an American; and perhaps an early German or French play will be given.

Prof. J. K. Paine wishes endowed opera in this country to stimulate American music. In every large town he would have an opera house, and its function should be as vital a part of popular education as it is in Europe. The conductors, orchestra, chorus and chief soloists should be appointed for long terms and moderate rates, and when old should retire on part pension. Every patron would be a beneficiary as is every student in a university, or patrons of libraries. Four million dollars would do it all.

Toys, says E. Harrison, exercise emotions. The nations that have most toys have most individuality, idealism, heroism, art and imagination. Of French origin are toy soldiers, theatres, Punch and Judy, dolls, tea-sets with wine glasses and finger bowls. The French dolls mirror the fashionable world with its finery and luxury. These dolls have faces of French fashion plates, and express the French salon of the eighteenth century. They are often dainty, hollow, do not last, and some have protested against them. The German toys are heavier and stronger, less artistic, and show home, farm and trade. Dolls' houses have inside kitchen and bed-room furniture, easy chairs, and lace tidies and flower pots. There are butchers', bakers' and blacksmiths' shops, and the belts, carts, and horses, and the woolly sheep, most ornaments for the christmas tree, and a few firearms, are of German origin. Swedish toys are bluntly carved cattle, flocks, shepherdesses. The English originated the rag doll, have many story books, but lack originality for toys, due, perhaps, to the prevalence of out door life. The Americans invented toy trunks symbolic of our habits of travel, and to some extent tool chests. Chinese and Japanese toys are perhaps most enduring of all.

Clarence King says that the old Roman idea of education as oratory, the Greek idea of it as philosophy and, later, grammar, the mediæval the classical, and other ideas of education are all partial and one-sided. He asks if we have not now reached the day for making an inventory of all that is known of mind and brain, natural sequences of growth, and getting thus a normal life history from birth to death, and then to chart a scheme of education that shall work easily and naturally in harmony with healthy and all-round development and not against it, and thus bring men to fullest maturity. Thus recast he thinks half of what is now university work will be done by the age of 10 or 12. The time will come when a university will no more have a teacher of French than it will have a class in teething. The knowledge needed for this basis will not come out of the pedagogic past or present but out of biology and psychology. Thus evolution will be made practical as the conservation of energy, the other great idea of to-day, has already become. The coming biological age will have a new bible of commandments.

The origin of scientific discoveries and inventions is threefold, says Dr. F. Rosenberger. Some are due to chance, others to work, still others to the direct insight of genius. Popular tradition is apt to attribute great inventions to chance. Kepler's law and Leverrier's discovery

of the planet Neptune were the results of long and wearisome work. But work alone is not enough. The insight of genius in some measure is always necessary. All three factors work together in every discovery. A beautiful illustration is Senefelder's invention of lithography. Discoverers are apt to err pedagogically in communicating their results merely by the deductive method of proof, instead of describing the inductive road that led to their discoveries. Newton, for example, has been blamed for proving all his results by the old geometric-synthetic method, and never telling how he attained them. Regretting this Laplace said: "Knowledge of the methods that a man of genius has employed contribute no less to the advance of science, and even to his own fame, than his discoveries." W. H. B.

During the school-years of 1886 and 1890 Supt. Greenwood of Kansas City measured and weighed some of the pupils between the ages of 10 and 18 attending the public schools under his charge. The pupils were measured with boots and shoes off, and weighed without wraps. In tabulating results account was taken of groups, not of individuals. Statistics relating to colored children were included and tabulated separately. In all over 6,000 children were weighed and measured. Statistics from Mulhall's Dictionary were employed as a basis for comparison. The examinations showed at ten little difference in height and weight between boys and girls, at 11 and 12 more rapid growth of the girls, which continues until 14 or 15, when the boys go ahead again. "It is a well-authenticated fact that there are periods in every child's life when the growth in height and weight are the greatest. These periods may not be synchronous. When the boy or girl is growing most rapidly, the vital functions are the most active in making accumulations for the future wants of the body. At this period the intellectual educational stress upon the system should be the least possible. Consequently, the rapidly growing child as a physical being should not be pushed too severely in his studies. This is the very age at which both teacher and parent are most likely to find fault with the child, owing to a superabundance of inertia. Excessive study, over-strain in late hours and loss of sleep, at this critical stage, will sap the foundation of the most vigorous constitutions, and lay germs of future weakness. . . . . Girls, especially those in high schools, learn more rapidly than boys; they stand usually much higher in their classes. This is doubtless owing to the fact that they cease to grow more rapidly, and cease to grow at an earlier age than boys, and their systems have attained, as it were, a higher degree of solidity than the boys of corresponding age. In this case the physical facts help to explain the mental differences. Two important educational questions naturally arise at this juncture.

1. What effect has physical growth on the pupil's intellectual faculties?

2. Because girls mature earlier in life than boys, is this the reason they reach a higher degree of excellence in schoolarship than the boys classed with them in the high schools and colleges?" W. H. B.

In the Kaiser Wilhelm gymnasium at Hanover (See *Zeitschr f. Schulgesundheits, pflege*, 1891, Nr. 3, p. 178), for several years active plays, especially football, have been conducted by the teachers. Participation in these sports is optional; and Dr. Kohbausch has collected some interesting statistics in regard to the attendance. Of 70 grown up pupils with brothers (the difference in the age being 4 years or less), 47 per cent. attended regularly, 16 per cent. irregularly. Of 68 only sons but 13 per cent. came regularly, 13 per cent. irregularly. Of the 75 per cent. of the latter class who did not attend, the majority were poor in gymnastics. The figures are, of course, too small for much in the way

of inference; but they suggest that the unnatural environment in which an only son is likely to grow up may be detrimental to physical development. W. H. B.

At a meeting of the Congress for Technical Instruction last year at St. Petersburg (according to the *Zeitschr. f. Schulgesundheits pflege*), resolutions were adopted recommending Sloyd as a subject of instruction, the introduction of obligatory manual instruction in all preparatory institutions and seminaries, the arrangement of a six-weeks' course for instructing the older teachers in Sloyd, and the forming of a special section for manual instruction in "The Royal Russian Technological Institute." W. H. B.

KOLB'S *Lesebuch in Handschriften*, Stuttgart, 1888, embodies an excellent idea. Many pupils when they leave the public schools are unable to read different handwritings readily and accurately, and are subjected to much inconvenience on this account. This little book is designed to give practice in reading script. For this purpose the author has made a collection of fac-similes of the writing of persons from all grades of society, including the handwriting of a number of noted men and several pages written with the left hand. The book might be improved by choosing for a part of it writing in a coarser hand; and at least a few pages of the vertical script should be added. For the sake of the eyes the time devoted to practice with the fine script given should be short. W. H. B.

The school must be a garden and the garden a school. In Sweden there are now over 2000 school gardens. They are now laid out there with most new country school houses. Sweden leads the rest of Europe in this regard. The best general treatise on the subject is the prize essay of Morgenthaler and Becker lately printed in Zürich (pp. 134). It contains four large colored plans and enumerates location, size, hothouse, 17 species of flowers, 33 Alpine plants, 42 ornamental trees and shrubs, 14 poisonous plants, grains, and medicinal plants, 11 grasses, 24 fodder plants, 50 garden plants, including cucumbers, cabbages, mints and spices, salads, 27 species of apple, 29 of pears, plums, cherries, grapes for four kinds of wine, 13 forest plants, willows for basket making, scare-crows, artificial birds' nests and houses, bees and honey making, silk-worm, compost and dung heap, tools, cost, etc. Such gardens breed order, love of nature, industry, natural science, health, and can be associated with animal houses, etc.

Mary Aber describes an experiment in education carried on in Boston and Chicago, in teaching children to read and write by the same plan used in teaching them to walk and talk; namely, by directing their attention to the end (the sentence, as an expression of their own thought) rather than the means (letters, words). At the same time the children's attention was directed toward the real and the tangible in every branch, rather than to the symbolic and the abstract. Progress in knowledge and power was in all cases surprisingly rapid. The experiments are well worth repetition by every teacher. T. P. H.

I. Naumann has just published in German a little "Handbook of Evangelical Ethics" for use in high schools, all in 50 pages. The most unique part is ten condensed pages digesting the history of ethical theories. Then follow duties to God, self, our neighbors and to all men.

The illustrated series of handbooks in gymnastic exercises by A. Alexander of Liverpool is admirable. After a long experience with the German, Swedish and other systems, he has at length reached an eclectic one that has a few new features. It is refreshing, after the ab-

horance of music by the partisans of the Swedish system, to see each exercise set to music, and to good, harmonious music too.

J. Boyle O'Reilly's book on athletics and manly sports has for its frontispiece Donoghue's great full length statue of J. L. Sullivan, and eulogizes boxing. Lord Anthrop felt it a public duty to attend every prize fight. What business, said O. W. Holmes, had Sarmatia to be fighting for liberty with a fifteen foot pole between her and the breasts of her enemies? Pugilism was essential to the education of the youth of Greece and Rome. Sir Robert Peel said nothing interested him like good boxing, nothing gave such courage, steadiness and self-control. "To the prize-ring is due whatever is known of order and fair play in a personal encounter." Sullivan is one of the most remarkable boxers in history. He introduced gloves and the round blow. His superiority is nervous. The author is as enthusiastic for boxing as the best of all exercises of mind and body as Thackeray was. Training is like cramming for examination. Respiratory and vital are often more important than muscle power.

C. Fleischmann tells us in a German pamphlet of 58 pages how to conduct school excursions, for children of different ages. What clothing, food, rules, objects to observe, direction for trips of half a day, all day, five days; how to march, what songs to sing, how to camp, games by the way, collections, regimen, scenery; how to utilize geography, history, natural and physical science, morals; all these are detailed with final illustrations of individual trips, tours for girls, etc.

De Bury describes the intense outburst of indignation in France against the debased *fin de siècle* literature which inveterately depicts the bad. The young men like Lasserre who are preparing this reaction are as much in earnest as Dr. Parkhurst. There is a new enthusiasm for the best, a *poésie du bien*, a spiritual, a "psychic" era, a "Desjardinism," and all date from the exposition. Greater usefulness and higher vision have gone together. Men's ideals work upon their private lives. At the last July Sorbonne conference the inaugural discourse of Professor Fabié was in poetry. This educational departure was an intended homage of the state to the new idealism. There is passion for the abstract, and the utmost sincerity. Men love to listen, and the favorite themes of many oral discourses, bringing soul close to soul are Columbus voyages into the unknown. Paul Desjardin, one of the best types of this movement, is totally desinterested, has lost self, is utterly pure. Forget self, and absorb all your interest in all that is good in others. Every single grain of simple intrinsic goodness must be adored. The supremacy of the truly good—this is the root of the whole new view of things. For the psychic school virtue is strength and Voltaire had no soul. We must have one. Wagner is an arch-inspirer and so was painting during the long period when poetry lay dead in France and ateliers were the only temples where nature inspired and was dimly understood and worshipped. Great souls in little lives, are companions in the new life. They live in an atmosphere not poisoned either by irony or by eternal straining after effect, and do not speak lightly of the deepest things, and abhor frivolity. Lavisse, the great pedagogue of youth considers it a chief if not the chief object of education to awaken a spark of poetic sentiment in the young. This new teacher aims at mental and moral elevation and unites men of the most diverse classes. It reveals that psychology gives a new point of view for regarding most great subjects both practical and theoretical, literature and art as well as science. Richet, who under the pseudonym of Ch. Epheyne has written the psychic romances "Possession" and "Sœur Marthe," is a man of science and far from religious belief. He represents psychic agency

as dominant but not necessarily supernatural. His new departure is also represented in frequent essays in the *Revue des Deux Mondes*, and in the *Journal des Débats*, and in his *l'Amour*. Each man holds that the highest moral excellence they all seek is found in his own profession. Beaurepaire a procurator general who writes as Jules Glouvet writes rustic psychic romances e.g. Le Forestier and Le Berger, where goodness is above intelligence. His life poetry must be lived. Law as law must be applied to the epoch of psychological crime now seen in France, and the court has become an arena for complex discussions of morals and psychology. Motives must be more fully studied. Beaurepaire is the man who finally convicted Boulanger and his summing up in the Gouffé murder case established conscience over the pseudo-scientific irresponsibility of the will. Moral conviction is not only found in the jury box but is re-casting criminal law. This has brought an enthusiasm of humanity into the law schools, and interest in psychological cases is extraordinary. The pupils of Lombroso and Garofolio are routed. So in medicine, every student of it, says Fouillée, must study not only all that concern hypnotism and suggestion but even occultism generally. Burne Jones and Puvis de Chavannes are also students of the science of life which does not exist without enthusiasm. Auto-suggestion is highest in the advance of human evolution; it is prophetic intuition.

The principle of Lavisse is internationalism. As his teaching of history slowly grew to inspiration, the answering enthusiasm of his students made deeds of enthusiasm, and history was felt as well as known. All waited and longed for higher truth yet to be evolved. The international association of student youths was founded. At the exposition all students assembled, and since many from distant lands have gathered not to be instructed but to be inspired and warmed. These young men were born during or just before the war of 1870, and are uniting to spiritualize thought in all its spheres. It is all an apotheosis of evolution, its religion. A great natural exposition is a work of soul. Under the Roman discipline which gave the French society and government and culminated in Richelieu and Napoleon the old mystic celtic spirit which of old found fit food in christianity and later expression—in Mirabeau now loves religion without dogmas, and is interested in Budha and Confucius but more in mystic christianity. The movement will conquer the cultured classes slowly and must then yet more slowly penetrate the fast paganizing lower classes. It is now a nebula and no one can tell when or how it will condense. The liberalism of the French revolution is thrice dead and even abused by young men and by Tolstoi. They seek some reason outside themselves for living, and are deeply interested in problems lately set aside as old wives tales. The Russian novelists and their new note of pity and the religion of suffering has won adepts, and so has socialism, and so has symbolism in art. All civilized races are fusing as at the christian era. Our cosmopolitan civilization is doing what Rome did. The ground is being leveled for a great building. Pessimism inveighs most bitterly against love.

In his *Le Nouveau Mysticisme*, F. Paulhan says that the vague phenomena which arise on the limits of knowledge, the active instead of the old passive pessimism, the decrease of energy in faith, the failure of christianity as too commonly administered to satisfy man's intelligence and heart, the character of a vast massacre-ground given to the world by the doctrine of the struggle for existance and selection, the heat of the great-money hunt in which most men are engaged, the collapse of systems and of nationalities, and the resulting electicism, the spirit of burlesque against all that is sacred, Madame Ackermann's blasphemies

against all old beliefs, extreme speculations, "administrative nihilism," theories of unbelief and immorality like those of Richepin, the horror of the ideal and the rage for denying it;—these combined make the present a time of mental and moral anarchy. Between this tendency and the new movement towards mysticism and faith intervenes a strange "love of the bad." This is seen in a decadent complasancy in depravity, often manifest but happly not very general. Pain becomes a form of voluptuousness, and so does pity. The invalid rather loves or admires his illness. Some love to torment themselves, and develop a passion for being pitied. They may take pleasure in seeing loved ones suffer, or feel an irresistable desire to do things disagreeable to them, or find an almost intoxicating pleasure in lying. This perversity, this horror of what is natural, is even expressed in rituals of deviltries, up to a "supreme vice," e. g., mutual suicide. The inventor of new badness is made an hero. This mystic love of satinism is incomprehensible save to natures of degenerative types. The new mysticism which is the third movement resulting from the preceding two (anarchy, and love of evil), is seen in the interest in hypnotism, occultisms, the cults of the unknowable and the unconscious, the sentiment of the solidarity of the human race, the new fields of psychology, anthropology and socialogy, and in the vague philosophical, platonizing forms of christianity.

DeVogüe says the official religion of France is science. Renan's "Future of Science" also expresses the lofty apsirations of the new French Government which expected science to satisfy moral needs, and the irresistable eternal want of the human soul. Science has been the chief nourisher of free minds, and the imagination of the elete, but it feeds only the few. This faith of and in science is going the way of the dogmas of 1789, viz, the almightiness of reason, absolute liberty and popular souvreignty. Even boys analize life and reach skepticism, pessimism, nihilism and premature lassitude; beware nature, life, and most of all love, its well-spring. There is no faith, and reason is a rogue they say. Out of the heart of this crazy realism has arisen a taste for simple modes of life and faith, a love of confirming experimental psychology by extracts from Thomas Aquinas. The old irreligion is regarded by young men as bad taste and weak-mindedness. They require seriousness, mental fervor in literature and love symbolism which brings home to their minds the mysteries of the Universe. They try to invent new religious and moral ideals. In Rod's phrases negative minds have slowly become positive. In this logical *ensemble* of ideas, beliefs, sentiments we can distinguish an enthusiasm for religion, pity for suffering, and sympathy with toil, eager curiosity for mysterious facts, pity for catholicism, once a state religion, now in the opposition and the victim of the government, and a mild need of universal harmony. Science no longer speaks to men's hearts as it did, and will soon have little to say to their imaginations. The new movement is not Christianity but it is a movement in its direction, and may be fraught with the most important consequences.

In his *The Authority of the Holy Scripture*, Prof. C. A. Briggs says, Men must have certainty as opposed to the probability of the 18th century and the agnosticism of this. Newman found it in the church, Martineau in his own soul, Spurgeon in the letter of Scripture. The Bible has been wrapped in creeds, dogmas, and worshipped blindly like a charm. It will not keep off evil spirits better than will holy water. Its inspiration is not verbal but conceptional. It is no matter whether Moses wrote the Pentateuch, David the Psalter, or who wrote any of the books. Only tradition associates authors names with parts of the Bible. If Judas or Herod wrote them they are as good. They are not

inerrant; miracles show loving purpose, and need not be said to disturb nature's harmonies. Prophecies too are sometimes wrong. All these are men-made barriers against philosophy, history, science, which the higher criticism has now penetrated and has brought us face to face with the Bible itself and its holy contents. Now a true biblical theology is possible. This shows first *Theophanies* in a long series to show the divine presence, and then the *Christophanies*, the theoeracy and doctrine of God. Man's original good has been magnified. Christianity is inconsistent with the present state of New York City, etc. It would redeem the bodies as well as the souls of men. Post-mortem perfection is progressive. Immediate judgment is a bug-bear. Abraham, Jacob, David and Solomon were morally of a low stage of development. We should not now receive them into our families. The greatest sin against the Bible has been the neglect of the ethecs of Jesus. Christians seem to think He did not mean what He said. New York to-day would crucify Him. New light is about to break forth from the Bible. The old method of building on selected texts is passing away. Reason must rise to its fullest powers and burn up last year's dead leaves and twigs and stubble to make way for the growth of a new springtime.

EDITORIAL.

This number of the PEDAGOGICAL SEMINARY contains digests of some seventeen thousand pages of carefully selected and recent educational literature. These are largely chips from our topical seminary work at Clark University. In making these digests we strive to attain the most exact and even artistic reproduction in miniature, leaving the reader to supplement and correct instead of making the latter our chief endeavor, as reviewers often and more easily do. See PED. SEM. I. 1, vii.

Prominent among the topics of this number is the natural history of childhood. This is so vast and complex a topic that specialization is now imperative if work of scientific value is to be done. In the first article, page 191, Dr. Burnham attempts to set forth the natural demarkations in this field. Professor Barnes presents a brief introduction to a profound but delicate topic, page 199, which is of immediate value to teachers and parents, and has important implications for alienists familiar with the literature of perversions. That the strongest religious beliefs of the children he studied should be at the age of 12 to 14 years, pages 200-201, that incipient school stages of nervous diseases are so early recognized, and may be aggravated by wrongly made courses of study and associated with false, dirty and pathological ideas of sex, is significant. The delightful book of M. W. Morley, page 251, is a pedagogic triumph in teaching sex as a part of nature's religion. Prof. Barnes' report on the circular described on page 331 comes too late for notice elsewhere. From 2,000 children who made 37,000 statements in answer to those questions, he concludes that of all the 33 objects, young children attend almost exclusively to their *uses*, and care very little for form and color or structure, etc. Yet it is with just these that primary instruction is wont to begin. Here again human nature must be accepted as true, and everything at variance with it as false and wrong. When children of seven, he says, have told you what a thing is good for, they think they have told all. A bird, *e. g.*, is to make meat with, or to lay eggs; a village is to buy candy in; a wolf is

good to get its hide; a horse is to ride, etc. At eleven, use still leads, but definition by a larger term becomes prominent. A house, *e. g.*, is a building; a dog is an animal. At fifteen larger term is ahead of use; color is least, structure and substance have increased. Interest in classifying into larger groups comes late, and so does interest in qualities. Thus to begin with superficial qualities may be well for college students, but it is radically wrong with children. Like Homer and Herodotus they dwell on movement and use. The development of their interests seems thus to follow a pretty definite law, and that law does not conform, so far as it can be seen, with Herbart's abstractly deduced categories of interests. The bearings of this on the theory of knowledge will be obvious to the student of philosophy. Queyrat and Burnham, p. 204, now first show fully the difference between *motives*, *visives* and *auditives*. Drawing, manual training and sports are for the first, book work, form and color are for the second, and oral work for the third (p. 215). Educational reformers now appeal to the first type as Comenius and object-lesson methods appealed from the memory work to visualization. So far as young children are *motives* their preference for use is explained, and the need of almost constant exercise and activity is seen. For further child-study see the suggestive book of Scholz, p. 245; Newin, p. 246; Tolstoi's idea of labor and life, p. 250; most of IV. p. 265; the recent work of Perez, p. 275; Passy, p. 276; Horsfall, p. 222; Mrs. Putnam, p. 231.

Another cognate theme pervading this number is health and exercise. This is deeply involved in many works just referred to. Mosso's address, p. 226, is so good that we have made for it the first exception to our rule to admit no translation. His criticism of the sudden jerky movements of the German system of gymnastics, which was devised for soldiers, the eclectic courses including certain movements from Spanish dances, p. 229, the book of selected games he describes, are practical. See, too, fatigue, p. 267; left-handedness and mirror script, p. 236; Dr. Burnham's historic survey, p. 282; Mr. Drew's digest, p. 307; and the papers of Drs. Taylor, p. 328, and Brown, p. 330.

Prominence is also given to ethical, p. 245, and religious, p. 252, training and to the interesting movement in France, p. 257, which will be resumed in a later number. The note on the first half of Mr. Salter's book, p. 316, and those on Professor Seth, p. 329, and President Hill, p. 330, are inserted as good samples of able men, typical of our time, who have worked their way to views on great questions that are clear, simple and morally effective, but as independent of the con-

ceptions commonly held by teachers as they are of each other. Special attention is also called to our extended anthology of hand-books of moral teaching, p. 246, et seq., and 319, and their extreme diversity. Precept, maxim, speculation, theory, great lives, stories of saints, golden deeds and fables and *Märchen*, the flag, civic duties, etc., are each urged. The vastness and impressiveness and pedagogic effectiveness of the God-idea in very diverse forms, are at least suggested by II.p. 252. The novelty and sublimity of a religio-ethical movement with no dogma whatever, which arouses and unites Catholics, Protestants, Jews and skeptics, cannot fail to impress all interested in religious training of whatever name, grade or form, or in ethology generally.

Special methods are discussed in English, pp. 280, 326, 327; in music, pp. 277, 278, 331; manual training, pp. 250, 267, 269, 281 and 332, besides the health literature above. Female education is treated on its health side by Mosso, p. 226, who insists on movements of trunk, chest, abdomen, slow and gentle movements, graceful walking, cadenced motions, and who hopes to see the time when it will be possible to compliment by saying to women that their beauty of body is greater than their accomplishments. See, also, on this topic, pp. 317 and 330. On language work see pp. 278-9, 298; on general educational theory, pp. 313, 315, 318, 320, 328; on the history of education, pp. 282, 301, 309, 311, 316; on university education, pp. 324-5, 333. There is also much miscellaneous and unclassified literature. More literature upon each of these topics and others is found in earlier numbers of the PEDAGOGICAL SEMINARY.

During the last July the two instructors of Clark University who conduct the PEDAGOGICAL SEMINARY, assisted by Dr. Sanford of the psychological department, undertook to conduct a summer school of two weeks. Circulars were sent to city and state superintendents, faculties of high and normal schools, giving a list of the chief topics which had been treated in extenso during the academic year, and requesting those interested to underscore those they would prefer to hear. The course was shaped to meet the most preferences. Nearly seventy of the best educational men and women came from more than twenty states. They were greatly in earnest, and it was proposed to give them as much work as they would take. The plan was for three three-hour sessions per day, at each of which Drs. Hall, Sanford and Burnham should lecture or give demonstrations. It was found, however, that some desired to work on the brain in the neurological laboratory, and so daily hours were set apart for them under a Fellow of

the university. Some desired to work with psycho-physical apparatus, some to use the special collection of books, pamphlets and articles provided and laid out upon each subject treated; some desired personal conferences, and perhaps assistance in independent researches they began during the school or had undertaken before, so that after the first few days, sessions of some kind were going on almost continuously from eight in the morning to ten at night, and still there were conflicts. Every resource of the university, apparatus, charts, assistants, library, rooms and buildings were placed at the disposal of the school. Besides the regular pupils, many more came for one or more sessions, so that sometimes nearly 200 were present. The local papers reported the work of the general sessions with such fidelity that many took away sets with them to supplement their notes. The amount of psychology and pedagogy that can be taught to pupils of such quality in twelve days of not less than nine hours is surprising. It is much to ask of instructors, whose work through the academic year has been so arduous, to add two weeks of such work to it, but they are now encouraged by the fact that in response to a circular letter sent some weeks ago to every member, no one has been heard from who does not desire another session. The recognitions of the work of the local Advisory Committee, without whose aid the school would not have been undertaken and could not have been successful, were not too heartily expressed by the resolutions passed by the members on the last day of the school, which included also a graceful tribute to the founder of the university. It was something entirely unique, original, and appears to have been no less completely successful.

The PEDAGOGICAL SEMINARY is now ready, if the necessary funds can be raised, to take an important and long contemplated step in advance of any that has yet been taken in this country. It is a step which, not only all its work, but years of previous preparation have steadily held in view, viz., the establishment of an ideal school for young children. The repeated and careful personal studies of schools of different countries, the diligent collections of the best literature, in reporting upon which the PEDAGOGICAL SEMINARY has already made so much of a beginning; the studies upon school hygiene and buildings; gymnastics, regimen, reading, arithmetic, drawing, moral and religious training, the education of teachers, some of which are already printed in this and preceding numbers; the collections of charts, diagrams, illustrative apparatus, etc., in our museum,—have all tended toward and will be incomplete till we have a school in which

all these can be brought together and embodied. It may be called the Seminary School, the University School, or bear any local or personal name. Very few have any conception of what anthropology, child-study, psychology, physiology, biology and hygiene when applied to practical pedagogy are now able to accomplish. Books, articles, journals and speeches can never show this. All these new fields of knowledge must be embodied in an institution which shall teach in the object-lesson fashions in which all now believe, what long and laborious studies in these and other lines have at last made feasible for education.

We must begin with the grounds and show what has been demonstrated to be practicable for even limited space. The buildings from cellar to roof must be models in plan, construction, heating, lighting, ventilating, flooring, seats and desks. For every room, class and subject, the best illustrative and practice apparatus should be used. It is strange that a country spending $140,000,000 yearly for lower education has nowhere an experiment station like this to show what vast economies are now possible.

Many if not most public schools to-day in this country are conducted too much like those outlying farms which are still without mowing machines and modern methods of drainage, fertilization and rotation of crops. They have little conception of what proven economic value are illustrative and other apparatus for young children, or how much thought and labor are embodied and imparted as by induction by certain instruments. The subject matter of each chief branch of study, too, now needs reconstruction to fit it to the transforming advances in science, which have often clearly revealed better and very different points of attack for beginning certain elementary studies, and a no less different sequence of topics, methods of teaching and study, and order of subjects. To fit the normal stages of growth of interest and capacity in childhood, most traditional branches of school work need, some more and some less, radical reconstruction to fit and mould body, mind, and heart, and to bring all powers to fullest health and unfoldment. How much saving of time in passing up the grades, how the best children could not only be allowed but encouraged to go on without being fretted, and perhaps discouraged and sterilized by being trained down to the step of the slowest; how reverence, conscience, intellectual interest, physical development can be increased,—these and many other problems can never be solved on paper, in board meetings, or in educational conventions, or by committees. These all may aid, but the only possible solution is a practical one. By this method all these problems will not only loose the

theoretical difficulties with which we have grown wont to invest them, but will pass to simple and ready solution. This is of course no place for details. These are copious and have been well and maturely considered, and these words are well weighed.

Such a school should begin at the beginning of school life and work its way slowly up the grades. It should be well endowed so as to be independent and free to do the best thing, and to make such innovation as may be needful. It should be able to employ the best teachers, who should be able intelligently to put in practice the best methods. It should be under the immediate direction of university men trained in the history of education, personally familiar with the best schools of many lands, and able to command the practical resources of the anthropology of childhood, psychology, pedagogy and hygiene. These men should be able to call upon the best university experts in each branch represented in the course. This would enable the best educational influences to work from above downward, because universities originate the material of culture and lower schools are the canals for its distribution. The creation of a lower school by a university might thus give a new philanthropic zest to science, and in other ways both parent and child would be better because of each other. Such a model or ideal school could not fail to bind university and town by a yet closer bond which would be mutually helpful. On these points there is much to be said later.

Such a school would not only be a boon to the children within reach of it and a constant stimulus to all educational work in the town, but could hardly fail to give it educational distinction abroad. It would bring students to the educational department of the university, to which it would be a pedagogical laboratory. It would bring visitors, especially if it was open during some of those parts of the year when teachers are free to travel. It would strengthen lines of home and outside interest begun by our summer school, and open many others. Some such effort is certain to be made somewhere, and we believe it can nowhere be conducted so well as under the same auspices as the summer school in this city, and in connection with the PEDAGOGICAL SEMINARY, where the idea originated.

A SCHEME OF CLASSIFICATION FOR CHILD-STUDY.

By Wm. H. Burnham.

The field of child-study for the teacher comprises more than what is strictly included in the psychology of childhood; for the teacher is interested in anything that affects the child's growth, health, and ability to work. Hence for the teacher anthropological studies, like those of Bowditch,[1] Boas, and Key,[2] may be as important as psychological studies; and investigations in pathology, like those of Cohn,[4] may be of as direct practical value as studies in experimental didactics. Hence child-study as a department of Pedagogy includes every investigation or observation of children that has any relation to education.

The first important systematic investigation of a number children, apart from strictly medical studies, was that made by Kussmaul,[5] the results of which were published in 1859.[6] Since that time, although little work has been done in comparison with the size of the field, a large number of observers have reported studies of more or less value. The work has been done, sometimes for the sake of the children, sometimes for the sake of teachers, and sometimes for the sake of science. In the last few years a large number of teachers have begun to report their observations, and some interesting scientific work has been begun. While it is desirable that much of this work should be limited to a small part of the field of child-study, it is also desirable that each investigator should see his own work in proper perspective, and in its relation to the work of others. Hence

[1] Reports of the State Board of Health of Mass., 1877, 1879, 1891.
[2] Results not yet published.
[3] Burgerstein: *Axel Key's Schulhygienische Untersuchungen*. Hamburg, 1889.
[4] Hygiene of the Eye, London, 1886.
[5] Untersuchungen über das Seelenleben des neugeborenen Menschen, Leipzig, 1859.
[6] Minor investigations had been made before by Löbisch, and studies of individual children had been made by Tiedemann and Darwin.

some scheme for classifying the work is necessary. A system of classification for such studies should be simple, elastic, and based upon psychological principles. Its divisions need not be rigid, but they should be convenient. In the following pages a system of classification is outlined which, it is hoped, may satisfy these demands; and some of the most important investigations already completed are mentioned.

The more scientific studies divide into two classes; first, the anthropological investigations, including studies of growth, development, and general health; second, the more strictly psychological investigations and observations. These two divisions, like the sub-divisions that follow, overlap and are interwoven, but are, nevertheless, convenient.

A.—*Anthropological Studies.*

Here will be classed the investigations in regard to the growth and health of school children, made by Bowditch,[1] Boas,[2] and Peckham[3] in this country; by Kotelmann,[4] Spiess,[5] Geissler and Uhlitzsch,[6] Carstädt,[7] and others in Germany; by Erismann[8] in Russia; by Key[9] in Sweden; Malling-Hansen[10] and Hertel[11] in Denmark; Roberts,[12] Crichton-Browne[13] and Warner[14] in England; and all similar studies.[15] The im-

[1] Op. cit.

[2] Results not yet published.

[3] Sixth Annual Report of the State Board of Health of Wisconsin.

[4] Die Körperverhältnisse der Gelehrtenschüler des Johanneums in Hamburg, Berlin, 1879.

[5] Deutsche Vierteljahrschrift f. off. Gesundheit, XVII. 1885. For a brief account of his results see a paper by Dr. A. G. Young on School Hygiene, Seventh Annual Report of the Maine State Board of Health, p. 275.

[6] Die Grofsenverhältnisse der Schulkinder im Schulinspektionsbezirk Freiburg. Reviewed in Zeitsch. f. Schulges., Vol. IV. p. 322.

[7] Über das Wachstum der Knaben vom 6. bis zum 16. Lebensjahre, Zeitsch. f. Schulges., Vol. I. p. 65.

[8] Die Schulhygiene auf der Jubiläumsausstellung der Gesellschaft für Beförderung der Arbeitsamkeit in Moskau., Zeitsch. f. Schules., Vol. I. p. 347.

[9] Op. cit.

[10] Perioden im Gewicht der Kinder und in der Sonnenwärme. Kopenhagen, 1886. Reviewed in Zeitsch. f. Schulges., Vol. I. p. 509.

[11] Neuere Untersuchungen über den allgemeinen Gesundheitszustand der Schüler und Schülerinnen, Zeitsch. f. Schulges., Vol. I. p. 201; also Overpressure in the High Schools of Denmark, London, 1885.

[12] Manual of Anthropometry, London, 1878.

[13] Report of Dr. Crichton-Browne to the Education Department upon the alleged Overpressure in Public Elementary Schools, 1884. Briefly resumed in Zeitschr. f. Schulges. I. p. 206.

[14] Mental Faculty, Cambridge, 1890; also Lancet, 1892, Vol. I. p. 567, and Report of the Seventh International Congress of Hygiene and Demography held in London, Aug. 10-17, 1891.

[15] For the references to minor investigations see Landsberger, Das Wachsthum in Alter der Schulpflicht, Archiv f. Anthropologie, Vol. XVII. pp. 229-264; also the Zeitschrift f. Schulgesundheitspflege, passim; and Roberts, op. cit.

portance of such anthropological studies in relation to education is obvious. Many of the minor researches and the work of Geissler and Uhlitzsch,[1] who measured 23,000 children in the Freiburg district, were carried on for the special purpose of determining the proper dimensions for school seats and desks. The extended investigations made by Key[2] also, which among other results of practical pedagogical value indicated that periods of maximum growth were periods of maximum power to resist disease, the studies of Malling-Hansen,[3] which showed that the growth of children varies with the seasons, the winter at least seeming to be a retarding influence, as well as all those studies which throw light on the nascent periods of development of the different organs of the body, are of prime importance to education. Even Virchow's study,[4] based upon a census concerning the color of the skin, hair, and eyes of more than six million German school-children, has pedagogical interest.

B.—*Psychological Studies.*

Psychology bases its classification upon the reflex arc. Here in simple form we have a type of all that is accomplished by the nervous mechanism;—first, an in-coming nervous current along an afferent or sensory nerve; second, a central process, more or less complicated; third, a nervous discharge along an efferent or motor nerve to some muscle, gland, or the like. The psychic processes typified by these three phases of the reflex arc are sensation, reflection, and action. Whatever is accomplished by the psycho-physic mechanism, from the simple reflex of the decapitated frog to the carefully reasoned action of a human being, consists of these three essential steps. The central process may be long and complicated, corresponding to a long train of thought, but the final goal is always a movement of some kind. Thus our thoughts have been called half-way stations to action, and, as Prof. Bain says, "Thinking is restrained acting or speaking."

Psychology makes three great divisions of psychic phenomena corresponding to localization of function in the brain and typified by these three stages of the reflex arc;—first, the sensory; second, cognitive and intellectual processes, and so on, corresponding to the central processes of the reflex arc; third, the motor processes. This gives us a scheme also for classification of the studies of children.

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[1] Op. cit.
[2] Op. cit.
[3] Op. cit.
[4] Farbe der Haut, der Haare und der Augen der Schulkinder Deutschlands, Archiv f. Anthropologie, XVI. 1886, pp. 275-475.

Studies of individual children like those made by Preyer,[1] Darwin,[2] and others, cover the whole field that I have described. Their work, however, readily divides according to the classification here outlined.

I. *The Sensory Field.*

Apart from the studies of individual children, most of the scientific work in this field has been on the pathological side. It is very important, however, in relation to education. It sub-divides, of course, according as it relates to the different senses.

1. In the field of the *dermal senses*, no systematic investigations have been made upon children, so far as I know, except the experiments with very young children made by Kussmaul,[3] Genzmer,[4] and others.

2. *Vision.*—Here are to be placed the studies made by Preyer,[5] Raehlmann[6] and others upon the development of vision in normal children and in those born blind and restored to sight—a class of studies very important to psychology on account of the problems (such as Nativism vs. Empiricism) involved. Important observations have also been made here on the pathological side. The eyes of many thousand children have been tested since Dr. Cohn,[7] by testing the eyes of 10,000 school children in Breslau, first proved the increase of myopia from grade to grade. Here also may naturally be placed investigations like those made by Berlin and Rembold,[8] Schubert,[9] and others, in regard to the movements of children's eyes in writing, testing the relation between the base line and the down-strokes, etc.

Many of the studies in regard to the development of vision, and especially such investigations as those last mentioned, strictly belong to the motor field; and this illustrates what has been said that any scheme of classification must not be rigid. For convenience these studies may naturally be placed here.

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[1] The Mind of the Child. New York, 1888.
[2] A Biographical Sketch of an Infant, "Mind," Vol. II. No. 7.
[3] Op. cit.
[4] Untersuchungen über die Sinneswahrnehmungen des neugeborenen Menschen. Halle, 1873.
[5] Op. cit.
[6] Zeitsch. für Psych. und Physiol. der Sinnesorgane. Band II. Heft 1 und 2.
[7] Op. cit. The literature up to date is given by Cohn. For an account of some recent investigations see Young, op. cit., p. 101, seq.
[8] Untersuchungen über den Einfluss des Schreibens auf Auge und Körperhaltung des Schulkindes, Stuttgart, 1883. See also Cohn, op. cit., p. 177.
[9] Zeitschr. f. Schulgesundheitspflege, II. pp. 61-76 and 387-401.

3. *The Ear.*—Besides the investigations made by those who have studied individual children, little has been done here except to test the accuracy and defects of hearing.

The first extended investigation in regard to the frequency of defects of hearing, so far as I am aware, was that made by Reichard,[1] only about fifteen years ago. He tested 1055 children, between the ages of 7 and 15, in Riga, and found about 22% who could not hear the ticking of a clock at a distance of more than twenty feet, while the other children could hear it at a distance of from twenty to sixty feet. Afterward Weil in Stuttgart tested nearly 6000 children; Moure in Bordeaux, 3588; Bezold, 1918 in the schools in Munich. Tests of hearing have been made also by Sexton (570 children), Barr (600 children), Schmiegelow (581 children), Gellé in Paris, Shermunski in St. Petersburg, Miss Wiltse[2] in Boston, and by several other investigators.[3]

4. *Taste and Smell.*—A few tests of the senses of taste and smell in infants have been made by Kussmaul[4] and others. But so far as I am aware, no systematic tests of a large number of children have been made. Here, however, may be mentioned the important studies in regard to nasal diseases. They are of great psychological and pedagogical interest. In 1868 Rupprecht noticed that a stopping up of the nose was often accompanied with inability to do continued mental work. Afterwards Michel, Seiler, Bresgen,[5] Hooper, Kafemann and others reported cases where nasal diseases were accompanied by weakness of memory and inability to keep the attention fixed on a definite subject. Kafemann[6] tested 238 children in Königsberg for nasal defect, and Dr. Chappell[7] 2000 in New York city.

II.—*Cognitive, Intellectual Processes, Etc.*

This part of the field readily sub-divides according to the usual psychological divisions—perception, imagination, memory, reasoning, etc.

Apart from the study and observation of individual children, comparatively little work has been done in this field. Among the important studies are the investigation in regard

[1] For a brief résumé of the results of these and the following investigations see Burgerstein, Gesundheitspflege in der Mittelschule, p. 24 seq.
[2] Amer. Jour. of Psych., Vol. I. p. 702.
[3] See Zeitschrift f. Schulges., passim.
[4] Op. cit.
[5] Ueber die Bedentung behinderter Nasenatmung vorzüglich bei Schulkindern, Hamburg, 1890.
[6] Schuluntersuchungen des Kindlichen Nasen, etc., Danzig, 1890.
[7] Am. Med. Jour. Feb. 1889.

to the contents of children's minds by Pres. Hall[1] and Supt. Greenwood[2] in this country, and by Hartmann[3] and others in Germany; experiments by Binet,[4] to test the power of perception in children; the studies of memory made by Mr. Bolton[5] in the Worcester schools; tests of the memory-span by Jacobs;[6] tests of imagination and other mental characteristics made by Mrs. Bryant;[7] Pres. Hall's[8] study of children's lies; much of Perez's work, and the investigations by Sakorski,[9] by Berger,[10] Burgerstein,[11] Miss Wiltse,[12] and others. Here should be mentioned also such studies as those of Prof. Barnes[13] of Leland-Stanford University on the religious ideas of children; much of the work done by Mr. Russell's[14] students; Johnson's[15] study of Rudimentary Society among the boys of the McDonough Farm School, and Pres. Hall's[16] Story of the Sand-Pile, although in part they belong to the motor field. The investigations by Mrs. Hicks in regard to the color preferences of children, and Prof. Wolfe's[17] study of the color vocabulary of children fall in this division too.

III. *The Motor Field.*

This division includes all the studies of children's language, their plays, their manual work, the development of voluntary control over motor activity, and the like. The different movements may be divided into reflex, instinctive, impulsive, voluntary, etc., or we may divide the motor activity of

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[1] Contents of Children's Minds on Entering School, G. Stanley Hall, Pedagogical Seminary, I. 2.

[2] Idem.

[3] Die Analyse des Kindlichen Gedankenkreises, Annaberg, 1890.

[4] Revue Philos., July and Dec., 1890.

[5] The Growth of Memory in School Children, Amer. Jour. of Psychology, Vol. IV. No. 3.

[6] Experiments on "Prehension," *Mind*, XII. pp. 75-82.

[7] Testing the Character of Children. Journal Anthropological Institute, Vol. XV. p. 338.

[8] Pedag. Sem. Vol. I. No. 2.

[9] For a brief account see Burgerstein, Die Gesundheitspflege in der Mittelschule, p. 44.

[10] Ueber den Einfluss der Uebung auf geistige Vorgänge, Wundt's Philos. Stud. V. I, 1888.

[11] Die Arbeitskurve einer Stunde, Zeitsch. f. Schulges., IV. 9-10.

[12] Observations on General Terms, Amer. Jour. of Psychology, Vol. III, No. 1.

[13] Results not yet published. See also the article *infra*.

[14] For a brief account of the method employed see The Academy, Vol. IV. p. 345.

[15] Rudimentary Society Among Boys, Overland Monthly, Oct. 1883.

[16] Story of the Sand-Pile, G. Stanley Hall, Scribner's Mag., June, 1888.

[17] The Color Vocabulary of Children, Harry K. Wolfe, Univ. Studies, Vol. I. No. 3, July, 1890. (Univ. of Nebraska.)

children less scientifically by taking in one group all reflex and automatic movements and by grouping the others under such common rubrics as the acquisition of language, play, acquired manual activities, etc. Not enough work has yet been done to make a very elaborate classification necessary.

Preyer[1] and others have observed the development of motor activity in the individual children studied by them. The studies devoted to child-language for the most part come here. Such studies[2] have been made by Sigismund, Taine, Strümpell, Darwin, Haldeman, Holden, Humphreys, Pollock,[3] Sully,[4] and others.

Studies of children's play naturally come in this division also. Such studies have been made by many different observers. In Newell's "Games and Songs of American Children," bibliographical references to a good part of the literature of children's play may be found.

Experimental work has been done by Binet,[5] who studied movements of walking, automatism, bilateral movements, and reaction-times. The most important systematic investigation in this field is the study made by Mr. Bryan of Clark University in regard to the development of the power of voluntary control of motor activity, the results of which have been published in the *American Journal of Psychology*, Vol. V. No. 2.

Observations of isolated activities of children and the like, such as those made by Mr. Russell's students in the Worcester Normal School, furnish much material in each of these three divisions. Similar studies have been made by the students in the Oswego Normal School, and by many teachers, under the direction of Prof. Barnes and Mr. Calkins.

In each of the three great divisions of the field of child-study as outlined above, it is important to study the abnormal and pathological as well as the common and the normal. Hence all of the divisions mentioned above divide again into studies of the normal and studies of the abnormal. Not very much work has already been done on the pathological side, except in the sensory field and in the study of the more common diseases. But beside the numerous medical studies,[6] reports

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[1] Op. cit.

[2] The work of most of these writers is summarized by Preyer in an appendix, op. cit. See also an arlicle by Dr. Sanford, PED. SEM., Vol. I. No. 2, pp. 257–260.

[3] Mind, III. pp. 392–401.

[4] Babies and Science, Cornhill Mag., May, 1881; also Baby Linguistics, Eng. Illus. Mag., 1884.

[5] Recherches sur les mouvements chez quelques jeunes enfants, Revue Philos., Mars, 1890.

[6] See Emminghaus; Die psychischen Störungen des Kindesalters.

of which are scattered throughout the various journals and archives, some work has been done in Germany by Ufer,[1] Siegert[2] and others. Important study of the relation of school-work to nervous diseases has been made by physicians, notably by Dr. Sturges[3] of London. The last mentioned physician has devoted especial attention to chorea and the conditions of school life that tend to cause it, and has shown the importance of pathological studies to teachers by distinguishing an incipient stage of many nervous diseases that he calls the "school stage."

Opportunity for Study. The opportunities for study in this field are as numerous as the practical problems that beset the teacher in the school room. If one have time and ability, one may take a small portion of this vast field and try to study it thoroughly. One may take the dermal senses for example; or, as this would be a large subject, a portion of the field, say the sense of discrimination. By making a large number of tests with the æsthesiometer or compass-points upon a large number of children, one might determine the average or normal acuteness of the sense of discrimination in children of a given age, the individual variation from this average,—studying special cases like Helen Keller and other blind deaf-mutes,—the difference between the sexes, the increase in sensitiveness with age, the effect of different methods of education upon this sense, etc. There are hundreds of such problems that have not been investigated. Those who have not time and opportunity for such technical study, can study individual children. Or, if one have little time, one may study concrete acts of children and the like; one may make a kodak picture, as it were, of an individual child at a given moment. Such work requires very little time and has generally been done by untrained observers; but it is nevertheless valuable, for it supplements, illustrates, and corrects the results of special scientific research. The prime motive for such study has generally been the training of teachers in the observation of children. It has been done directly for the sake of the teachers; indirectly for the sake of the child, and incidentally for the sake of science. The syllabi for such study have frequently covered a wide field. It would seem well, in some instances at least, if this work could now be supplemented by limiting the field and observing special points.

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[1] Ueber Geistesstörungen in der Schule. Wiesbaden, 1891.
[2] Problematische Kindesnaturen, Leipzig, 1889.
[3] Report of the London Congress of Hygiene and Demography, 1891; also the Lancet, 1885, Vol. I. p. 9, and 1887, Vol. I. p. 112, seq.

FEELINGS AND IDEAS OF SEX IN CHILDREN.

By Prof. Earl Barnes,
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From the time that children begin to think of the world about them, they are interested in what may be called sex questions. They soon begin to inquire as to their own origin, the functions of special organs in themselves and in other animals, the relations of the family, and the meaning of words they occasionally meet. As they become older, new forces develop in them, their bodies take on new functions, and knowledge becomes necessary to them. This knowledge exists in two forms, the one, scientific, true and clean, is possessed in some degree by intelligent parents and teachers; the other, morbid, false and dirty, is possessed by vulgar men and women and by many children. At least nineteen-twentieths of American children draw their information to-day from this latter sort of knowledge. In back alleys, on the way to school, in the servant's room or from an older comrade, they master a vocabulary which goes back philologically to our Aryan beginnings, but to print which is a crime; and they acquire a set of morbid, visual images which will accompany them through life. This knowledge deals with pathological aspects of sex activity, hence when the child comes into possession of his sex powers he is prepared to exercise them pathologically.

Educators and parents have both considered it impossible to give their own knowledge to children as needed; at most they have dealt it out in diluted forms as a medicine to correct evil habits already acquired. There is, however, a tendency at present in the other direction, and I have now a list of fourteen men and women who are themselves answering all their children's questions with the simple direct truth.

Several classes of people have thus far written books on the subject of sex. Biologists have studied its development from the lowest forms upward. Neurologists and alienists have long been interested in these questions, and have collected a considerable literature on the subject. Krafft-Ebing's *Psychopathia Sexualis* is the leading study on

pathological cases. An admirable sketch by Alfred Binet is to be found in the *Revue Philosophique*, for August and September, 1887.

Reformers and students of social science have also dealt with the subject, but generally from benevolent or sentimental standpoints. The White Cross Series best illustrates this class of publications, but none of them add very much to our knowledge.

The struggle over the extension of co-education in our higher institutions of learning during the past few years has produced a voluminous literature on the sex subject. Dr. Edward H. Clarke's book on *Sex in Education* has called out many replies, most valuable among which are the collections of statistics made by the Women's Collegiate Alumnæ Association.

There is also a considerable number of books intended to introduce children from ten to fifteen years old into the mysteries of sex. Some of these have had a remarkable sale; one, intended for girls, has reached its twentieth edition. Some of these books are direct and coarse, while others hide the facts they wish to impart under such a mass of botanical and zoölogical comparisons that they simply awaken a curiosity which they do not satisfy. Best among these is Margaret Morley's *Song of Life*, a clear and accurate book which possibly does too much botanizing.

One must add to this list of books those morbid self-dissections sometimes met in autobiography, of which Rousseau's Confessions is a leading type.

These studies so far mentioned are from the biological, pathological, reformatory, sentimental, polemical, instructive or morbid points of view. None of them make any attempt to trace the normal development of sex feeling and ideas in children, nor to examine the sex conditions actually existing in children's lives. One of the most important results of pathological studies in its influence on educational work, has been its demonstration of the fact that the sex feeling may, in morbid cases, be withdrawn from its natural modes of expression and may attach itself to almost any physical, mental or æsthetic activity, and will then greatly reinforce such activity. In the second number of this journal, Dr. Wm. H. Burnham published an article on Adolescence, which has attracted widespread attention. At the meeting of the National Educational Association in July, 1892, we discussed at one of the round-tables the development of the ideas and feelings of sex in children; but the discussion constantly drifted from what is to what ought to be. The desirability of giving information to children when asked for was dis-

cussed at length, and the opinions were as varied as they generally are on everything connected with this subject. Some advised answering all questions simply and directly; others would on no account shock the child with the fact that he was once carried under his mother's heart; but would instead tell him that he came from God, or that he must wait for information till older; a still larger class simply did not know what to do. No one knew what the effect of giving information is, but each had a theory.

In our own work, in the department of education here, we have only incidentally dealt with the sex question. In a study on the development of color-sense we find that with 996 children of all grades, while the colors selected as favorite colors by 524 girls are essentially the same as those selected by 472 boys, more girls than boys select red and less girls than boys select blue. If with increasing years children generally select more red and less blue, as seems to be the case, then this would indicate that school girls are more mature than boys on an average; but these points require further investigation. Grammar grade girls certainly have a considerably larger color vocabulary than boys of the same age, and they make better color combination, but this may be due simply to the circumstances of their lives.

A study on the fear instinct with 1034 Oakland and Santa Cruz children shows that the boys are quite as subject to nonsensical fear of darkness, feathers and spooks as girls are, and quite as free to confess their fears.

A study on the religious beliefs of more than a thousand children shows no considerable difference between boys and girls; but it shows that children on this coast have their strongest theological convictions from twelve to fourteen years of age. From this time on, doubts are apt to assail them and they try to harmonize their theology with their science and history. This generalization was reached before we had thought of connecting it with the period of puberty.

Miss Mollie Conners of the Oakland High School has recently collated one hundred compositions written by boys and girls from the first year of the high school. A fine photograph of the Sistine Madonna was placed before them and they were asked to write anything that was suggested to them by the picture. They were told nothing concerning the picture. The results show that boys express themselves with more freedom and feeling concerning the naked baby and its relations to the mother, the mother's feelings, etc., than the girls do, but of course several reasons may be given for this. This seems to me to suggest a hopeful method of investigation.

With a study now in progress on 2900 children from Monte-

rey County, California, following Binet's tests in perception, we are certainly able to demonstrate that the girls in that county from 11 to 13 years old have a considerably more detailed and extended knowledge of common objects about them than is possessed by boys of the same age, or else they have superior power of expression.

Supt. Greenwood's studies show that Kansas City boys are superior in height and weight to the girls except during the period from about 12 to 15, when the girls are superior. It will be interesting to learn if there is the same intellectual difference.

All this is meagre, but it is a beginning. The following are some of the questions which it would seem that we might take up to-day by direct investigation: What are the intellectual, moral and æsthetic differences between boys and girls at different ages? When and under what forms do questions concerning matters of sex first appear in a child's mind? How are these questions answered at present? What is the effect in cases so far tried of giving information when asked for? How early and under what circumstances are bad sexual habits acquired? What efforts have been made to correct them and with what results? What is the effect of bringing up or educating boys by themselves? What changes take place in children, physical, mental, moral or æsthetic, at the age of puberty? What is the effect of placing boys from ten to fifteen years old under the constant direction of young women? What is the effect of placing girls of this age under the care of men? Does it in either case arouse a precocious and morbid sex feeling? What is the effect of educating boys and girls together in the high school period? What is the effect of certain kinds of music upon the passions in childhood? of poetry? of romance? of scientific instruction? We should also collect a full bibliography on this subject. Many things already written are not generally known, and it is with difficulty that one learns about them.

These questions cannot be settled by asking a number of leading educators for their opinions on the subject; they must be settled by careful experimental tests, devised to gather returns from large numbers of children under similar environment. It is true the facts are hard to get at, but it is possible with patience and skill to reach them in sufficient quantity to form large generalizations, which will become truer as more and more material is collected. If half the parents now in the United States who have tried the plan of answering all their children's questions directly and plainly when asked, would report their experience to a common center where they could be collated, we should have

a basis of fact on which to act. If one hundred men and women would honestly answer a set of questions that could be put to them, it would give us large generalizations based on fact, of the greatest value to teachers and parents, and nearer to the truth than anything the world has yet known. The beginning of such collection has been made in this department, and several valuable manuscripts have been put on deposit here. It is not necessary that the names of observers should be preserved here, but it is necessary that we should know what degree of credit to give to any matter contributed, so if papers are not accompanied by name they should be forwarded through someone who can vouch for the writer. If any one will assist us with suggestions, or by making observations under our direction, they will confer a favor on me and on my department, and the materials will be accessible to any earnest man or woman who at any time wishes to study the subject.

INDIVIDUAL DIFFERENCES IN THE IMAGINATION OF CHILDREN.[1]

By Wm. H. Burnham.

Since Kant it has been customary to distinguish between the reproductive and the productive imagination. The former merely reproduces ideally sense-impressions; the latter recombines original impressions to make new wholes. Briefly, the one is the imagination of any Gradgrind; the other the imagination of the poet and the painter. Leaving out metaphysical considerations we may say, then, that the work of imagination is either the reproduction of images or their combination. The reproductive imagination must furnish all the raw material. The productive imagination may combine this material in endless variety, but is at the same time limited by it. Differences of imagination are both of degree and of quality. Differences in reproductive imagination are largely qualitative differences. Differences in productive imagination are differences of degree. It is the purpose of this paper to illustrate these differences.

I. *Differences in Reproductive Imagination.*

The primary meaning of the word *image* is, of course, a visual picture; but the usual psychological meaning is rather a copy of any sensation. An image, as Taine puts it,[2] is a spontaneously recurring sensation, which in general is less vivid and less precise than the sensation properly so

[1] Queyrat, F., *L'Imagination et ses Variétés chez l'Enfant*, Paris, 1893.

Binet, A., *Jacques Inaudi*, Revue des Deux Mondes, June 15; translated in the Pop. Sci. Mo., Nov., also in the Chautauquan, Sept., 1892.

Beaunis et Binet, *Questionnaire de Psychologie Adressé aux Peintres*, Revue Scientifique, Sept. 10, 1892.

Binet, *Mental Imagery*, Fortnightly Review, July, 1892.

Ribot, *Une Enquête sur les Variété des Concepts*, Revue Scientifique, Sept. 3, 1892.

James, *Psychology*, Chap. on Imagination.

[2] On Intelligence, p. 36.

called. Under present conditions of education imagination's content is made up chiefly of elements from four different sources, namely, the senses of sight, hearing, the muscle sense, and the dermal senses. Four different types of mind have been distinguished according as images from one or another of these four senses predominate in imagination.

1. *The Tactiles.* Those who reproduce in imagination chiefly impressions from the dermal senses—the so-called tactiles of French writers—are, I believe, very rare. The best if not the only examples of this type are found among the blind. Blind deaf-mutes like Laura Bridgman and Helen Keller must, obviously, belong either to this or to the motor type, or to an evenly balanced tactile-motor type. All of us, however, can with more or less vividness reproduce images of touch; and with some they play a much more important part than with others.

2. *Visual Type.* The majority of people, perhaps, belong to this class; visual images predominate in their thinking, and consequently the eye is usually most highly prized of the senses. The popular opinion is admirably expressed by Thoreau:

"The eye does the least drudgery of any of the senses. It oftenest escapes to a higher employment. The rest serve and escort and defend it. I attach some superiority, even priority, to this sense. It is the oldest servant in the soul's household; it images what it imagines, it ideates what it idealizes. Through it idolatry crept in, which is a kind of religion. If any joy or grief is to be expressed, the eye is the swift runner that carries the news. In circumspection, double; in fidelity, single, it serves truth always, and carries no false news. Of five castes, it is the Brahmin. It converses with the heavens. How man serves this sense more than any other! When he builds a house, he does not forget to put a window in the wall. We see truth. We are the children of light. Our destiny is dark. No other sense has so much to do with the future. The body of science will not be complete till every sense has thus ruled our thought and language and action in its turn."[1]

There are, of course, among their class great individual differences, varying from the visualizing power of the ordinary individual who can learn a series of figures or a list of words easier by seeing them than by hearing them, to that of the painters who can visualize a subject after one sitting, or of the mathematical prodigies, like Bidder, who, it is said, could see, "as if photographed on his retina, the exact figures

[1] Thoreau, Autumn, pp. 56-57.

whether arithmetical or geometrical, with which he was occupied."[1]

Fechner was perhaps the first to call attention to individual differences in visualizing power; and the results of Galton's[2] important investigations are well known. While the latter found men of science usually deficient in visualizing power, people in general society furnished him with numerous instances of remarkable visualizing power. Some persons read their speeches from mentally seen manuscripts; others have number-forms in which figures always arrange themselves. "Some few persons," says Galton, "see mentally in print every word that is uttered; they attend to the visual equivalent and not to the sound of the words, and they read off, usually as from a long imaginary strip of paper, such as is unwound from telegraphic instruments."[3] Mr. Petrie habitually works out sums by aid of an imaginary sliding rule, which he sets in the desired way and reads off mentally. "The power of visualizing is higher in the female sex than in the male," says Galton, "and is somewhat, but not much, higher in public school boys than in men." And of the visualizing power in children he says: "There is reason to believe that it is very high in some young children, who seem to spend years of difficulty in distinguishing between the subjective and objective world. Language and book-learning certainly tend to dull it."

Many cases of good visualizing power among children might be cited. George Sand seems to have been a good visualizer and to have retained her power in later life. "I never look at certain mosses in my herbarium," she says, "without finding myself again under the oaks of Frascati. A little stone makes me see again all the mountain from which I brought it, and recall the same with all its minutest details from top to bottom. The odor of the *liseron-vrille* makes a terrible Spanish landscape appear before me, of which I know neither the name nor the location, but which I passed by with my mother at the age of four." A more remarkable case is that of the painter Doré. When a youth he reproduced Raphaels from memory. He objected to the study of models except in the swimming school, and said: "My mind is my model for everything."[4]

Some of the cases of extreme visualizing power among adults are the best illustrations of this type. For a single example, take the frequently cited case reported by Charcot. The visual-

[1] Scripture, Amer. Journal of Psychology, IV. 1, p. 57.
[2] See Inquiries into Human Faculty. New York, 1883.
[3] Op. cit. p. 96.
[4] Macchetta, Life of Doré, p. 99.

izing power of one his patients is described as follows: He no sooner thought of persons or things, but features, forms, and colors rose with the same clearness, sharpness and accuracy as if the subjects stood before him. When he tried to recall a fact or a figure in his voluminous polyglot correspondence, the letters themselves appeared before him with their entire content, irregularities, erasures and all. At school he recited from a mentally seen page, which he read off line by line and letter by letter. In making computations, he ran his mental eye down imaginary columns of figures, and performed in this way the most varied operations of arithmetic. He could never think of a passage in a play without the entire scene, stage, actors, and audience appearing before him. After business troubles, loss of sleep, and so on, a great change occurred in this man. Everything now seemed new and strange. He had lost all memory of forms and colors. Every time he returned to A., from which place business often called him, he seemed to himself as if entering a strange city. His memory gradually returned, however, or rather he could use it in a different way. In short he had lost his visual memory and become ear-minded. In his condition after this change he will serve as an illustration of the third class.

3. *The Auditory Type*. He can no longer draw. Asked, for example, to draw an arcade, he says, "I remember that it contains semi-circular arches, and that two of them meeting at an angle make a vault, but how it *looks* I am unable to imagine." He cannot remember his wife's and children's faces. He knows that his wife's hair is black, but he cannot recall its color. "Now when he seeks something in his correspondence, he must rummage among the letters like other men, until he meets the passage. He can recall only the first few verses of the Iliad, and must *grope* to read Homer, Virgil, and Horace. Figures which he adds he must now whisper to himself. He realizes clearly that he must help his memory out with auditory images, which he does with effort. *The words and expressions which he recalls seem now to echo in his ear, an altogether novel sensation for him.* If he wishes to learn anything by heart, a series of phrases for example, he must *read them several times aloud*, so as to impress his ear. When later he repeats the thing in question, the sensation of inward hearing which precedes articulation rises up in his mind. This feeling was formerly unknown to him..... He dreams no more in visual terms, but only in words, usually Spanish words."[1]

Such is the auditory type. This class probably is not nearly as common as the visual type; but still there are

[1] James, Psychology, Vol. II. pp. 58-60.

many poor visualizers who seem to have unusually good auditory memories. The difference between the two types is illustrated by an example given by M. Bernard.[1] "When I write a scene," said Legouvé to Scribe, I *hear*, but you *see*. At each phrase that I write, the voice of the person that speaks strikes my ear. Your actors walk about, they gesticulate before your eyes. I am a *listener*, you a *spectator*." "Nothing is more true," said Scribe. "Do you know where I am when I write a piece? In the middle of the parterre."

There are no sufficient data to show how common this type may be among children; but some interesting cases have been reported. Many singers belong to this type. The case of Mozart is usually cited. At the age of fourteen, after hearing Allegri's *Miserére* for a single time,[2] as he was forbidden by the popes to copy it, he reproduced the entire work from memory. This power of auditory memory is frequently found at a very early age. A case is cited of a child who at the age of nine months could repeat accurately notes played on the piano. Stumpf's child could follow the scale in singing at the age of fourteen months; and it is said that the son of the composer Dvorak, at the age of a year and a half, could sing his father's melodies while the latter accompanied him on the piano.[3] Mozart composed at the age of six years, and other famous musicians have shown their power at an early age.

Another example of the auditory type seems to be furnished by Inaudi, the mathematical prodigy. A Piedmontese shepherd in early life, he first manifested his passion for figures at the age of 6, and at the age of 7 he could multiply numbers of five figures. He used no material aids, such as counting upon the fingers, pebbles, and so on, like some other famous calculators; but the operations with him were entirely mental, and he used only words. He could not read, but his brother taught him the names of numbers up to 100, and by these names he represented numbers to himself in his calculations. In 1880, at the age of 13, he came to Paris, and has since learned to read and write, and is skillful in playing cards and billiards. He performs operations in addition, subtraction, multiplication, division, extraction of roots, and arithmetical problems corresponding to equations of the first degree. These are all mental calculations, without any reading, writing or mnemonic device. As an example of his work he was asked the number of seconds in 18 years, 7

[1] De l'Aphasie, p. 50. Cited by Queyrat, op. cit. p. 66.
[2] Taine says *twice*, op. cit. p. 41.
[3] Queyrat, op. cit. p. 63.

months, 21 days and 3 hours. He gave his answer in 13 seconds. But he knew beforehand the number of seconds in a year, month and day. The basis of his calculations is multiplication. In multiplying he begins at the left, as is usual with mathematical prodigies; and he decomposes a complex problem in multiplication into a series of simple ones. Many of the arithmetical prodigies have performed such examples by visualization. Bidder said that he always depended upon visual images in his calculations and could conceive of no other possible way of doing mental arithmetic. But Inaudi does not visualize.

"When a problem is given to him orally," says Binet, "he repeats it to himself, articulating distinctly, as if he were stamping it upon his mind; if he does not understand it he asks to have it repeated. Problems can be given him in writing, but he prefers to receive them by means of the voice; if he accepts them in a written form he always reads them in an audible tone. When he has grasped the question, he says, 'I am ready,' and begins to whisper low and very rapidly; in this indistinct murmur a listener can occasionally catch the names of figures. Nothing can distract his mind from its quest, he carries on the most complex operations in the midst of the tumult of public exhibitions. More than this, he can talk with others while performing this mental work; he responds correctly to questions, will even sustain a regular conversation, without disturbing his mathematical work; the only difference to be observed under these circumstances is that the result is not reached so rapidly. During the solution he occasionally puts his hand to his forehead, or shuts his fists, or traces imaginary lines with the index finger of his right upon the palm of his left hand. Then, always at the end of a very short time he announces, 'I have it,' and gives the solution, and, for his personal satisfaction, proves it." When closely questioned by a commission of the French Academy, "he affirmed without hesitation," says Binet, "that he had no visual representation of the figures whatever." "I hear the figures," he said emphatically, "and it is my ear which retains them; I hear them resounding after I have repeated them, and this interior sensation remains for a long time." Some time later in replying to a new question put by Charcot, he renewed his assertion. "Sight serves me nothing; I have much more difficulty in remembering numbers when they are given to me in writing than when they are repeated. In the former case I am put under a great restraint. Neither do I like any better to write the figures myself; the writing does not help me at all to recall them." When he begins his solution, he turns his eyes away from the

written figures, the sight of them serving to embarrass his calculation. Regarding this he recently made a pertinent remark. "You ask me," he said, "if I see the figures. It is scarcely four years that I have known their written form, and long before that time I was making my calculations."

Hence Binet concludes that Inaudi's mind is of the auditory type; but it is evident that he depends largely upon motor images also, for he whispers the figures as he calculates. When Binet asked him to sing in one tone as he worked, four or five times as long was required for the calculation, and even then his voice betrayed the fact that he was articulating.

4. *The Motor Type.* In the intellectual operation of persons of this type, images of movement predominate. There are no data to show how numerous this class may be. All of us depend largely upon motor images, for they are necessary to the execution of movements, as is shown by pathology. When the images of a certain class of movements are destroyed—as in motor aphasia, agraphia, and the like—the patient is no longer able to execute these movements. Probably the blind depend very largely upon motor images. Blind deaf-mutes would seem especially likely to belong to the motor type, although, of course, they may be tactiles. I watched Helen Keller while she was engaged in thought, and she kept her fingers busy spelling her thoughts in the finger alphabet. Berthier, a deaf-mute, said of himself: "Although my fingers and my hands are immovable, I feel, when I think, that they are in activity. I see internally the image that they produce. I feel that my thought exercises itself and identifies itself with these movements which the external eyes do not see."[1]

Prof. Stricker has described his own imagination very fully[2]; and his case, if not the most remarkable on record, is probably the one that has been most carefully studied. His recollections both of his own movements and those of objects are accompanied invariably by distinct muscular feelings in those parts of his body which would naturally be used in effecting or in following the movement. In thinking of a soldier marching, for example, it is as if he were helping the image to march by marching himself in his rear. And if he suppresses this sympathetic feeling in his own legs, and concentrates all his attention on the imagined soldier, the latter becomes, as it were, paralyzed. In general his im-

[1] Queyrat, op. cit. p. 86.

[2] Studien über die Sprachvorstellungen, 1880, and Studien über die Bewegungsvorstellungen. I cite the résumé given by Prof. James, Psych. II. p. 63.

agined movements, of whatsoever objects, seem paralyzed the moment no feelings of movement either in his own eyes or in his own limbs accompany them. The movements of articulate speech play a predominant part in his mental life. "When after my experimental work I proceed to its description," he writes, "as a rule I reproduce in the first instance only words, which I had already associated with the perception of the various details of the observation while the latter was going on. For speech plays in all my observing so important a part that I ordinarily clothe phenomena in words as fast as I observe them."

That children depend largely upon motor images, especially those of articulation, is clear from the common habit of whispering the words as they read. But whether images of articulation or of hearing predominate in the minds of such children it is hard to say. That these two kinds of images may be divorced is evident in the case of deaf mutes who learn to talk. But the vocal organs have been intimately associated with the ear in all the experience of the race; and further observation may show that an articulatory-auditory type is far more common than either by itself. Inaudi, as has been said, depends upon the images of articulation as well as upon those of hearing; and Stricker, on the other hand, has very good auditory memory.

There are then four types of the reproductive imagination —the tactile, the visual, the auditory, and the motor. A fifth type is distinguished by French writers, where imagination's content is made up of images from these different sources in equal proportion, and, of course, there are infinite individual variations according to the varying proportions in which images from the different sources are present. In this so-called normal type the reproduced images are sometimes visual, sometimes auditory, and again sometimes motor or tactile. The way in which one of this type remembers depends largely upon the method by which anything was learned. The visual memory retains what has been learned by reading, the motor memory what has been committed by recitation, the auditory memory what has been acquired by hearing. Queyrat gives an illustration from his own experience. While in memory he *sees* one literary quotation, and *articulates* others, the martial strophes of the *Marseillaise* resound in his ears.[1] The distinction between these different memories is well shown in methods of learning foreign languages. Some understand and can speak a language which they are entirely incapable of reading, and *vice versa*.

[1] Op. cit. p. 122.

As everybody knows, reading a language is a very different thing from speaking it. Ballet gives a case in point. One of his friends has both visual and auditory memory for English. He reads and understands it when spoken with equal facility, since he acquired it first by conversation, then by reading. It is quite different with German, which he has heard spoken a great deal, but has read but little. With German he has difficulty when he limits himself to mental reading; but he understands well when he can read the piece aloud.

II. Differences in Productive Imagination.

Popular speech divides the world into two classes—the imaginative and the unimaginative. But all children, unless they be idiots, probably have productive or creative imagination in some measure; and among them the differences in degree are much greater and more important than is usually supposed. The child with deficient imagination may be sluggish and stupid or too constantly engaged in concrete activities in the real world. But in either case reality satisfies him. Examples of unimaginative children are familiar, but it is not as easy to find illustrations of this class in literature as of the imaginative; for the child of deficient imagination is likely to be uninteresting, if not actually stupid. Imaginative children, however, have been observed again and again, and illustrations of their ability in combining the raw material of thought will show by contrast the individual differences in productive imagination.

Pres. Hall (Ped. Sem. I. 2, p. 213) and others in the study of children have shown the manifoldness of their imaginations' content, and called attention to that ideal world that lies very near about us in our childhood. The same thing has been impressed upon me by reading some of Mr. Russell's records under the rubric *Phantasy*. The imaginative child often seems to live half his life in a world of poetry and make-believe. Such imaginative children not only have imaginary playmates, and personate animals and men, sometimes doing grotesque or outlandish things for the sake of playing their *rôles*, but they almost reconstruct ideally the world in which they live. Beasts, birds, and their food and furniture talk with them. When the dew is on the grass, "the grass is crying;" when the stars come out, they are candles or street-lamps lighted by little boys, or, perhaps, cinders from God's stove; butterflies are pansies flying; icicles are Christmas candy. They have play-brothers and sisters, and dear friends with whom they talk. Sometimes God talks with them, even in a way that may seem sacrile-

gious to an on-looker. Even the prosiest things are vivified. The tracks of dirty feet on the floor are flowers; a creaking chair talks; the shoemaker's nails are children, and he drives them to school; a tin-peddler is Santa Claus. Generally some object—a piece of wood or cloth or a stone—is required as an *Anknüpfungspunkt*, yet some children are so idealistic that they need no such objective aids. To them dolls and the like are stupid, cold and unreal substitutes for the warm creatures of their imaginary world. It is not entirely a world of joy. Shadows become wild beasts; a statue may seem alive and terrify them; any object once associated with fright is a constant source of alarm; and sometimes the phantoms of their own creation become unmanageable like the delusions of the insane. Much of this imagining centres about their own personalities, and consists in ideals for the future. The material for it comes largely from their reading.

Those who have such remarkable productive imagination live in a mental world as unlike that of the ordinary prosaic person as the world of a deaf mute is unlike that of a person with all his senses. The differences in degree are so great that they have become differences in kind. To such poetic persons imagination is at once their inspiration and temptation in health, their comfort and torment in illness. Numerous illustrations from literature might be given—Savonarola, Swedenborg, Rousseau, Shelley. For a single concrete illustration of the imaginative child, I know of none better than that furnished by George Sand in her autobiography. I borrow from Sully's interesting study of her childhood.[1]

She appeared strange and deficient in childish traits to the commonplace observer; yet "the untamed and untamable 'oddities' were, after all, only certain common childish impulses and tendencies exalted," or exaggerated. She was possessed of such a vivid imagination that she suffered terrors from her interpretation of the real world, but found supreme delight in an ideal world of fiction. She could concentrate her whole consciousness in this imaginary world and forget her actual surroundings. The echo of her own voice made her think she was double, that another was round about her, whom she could not see, but who always saw her. Combining this with the ocular spectra caused by looking at the golden globe of a church she formed the theory that everything has its double. Her mother's voice reading to her in the evening threw her into a stupor of day-dreaming. Images formed and settled on the green screen before the fire. "They were woods, meadows, rivers, towers of a grotesque

[1] Longman's Magazine, Dec. 1889, and May, 1890.

and gigantic architecture, as I have often seen them in dreams, enchanted palaces with gardens like nothing that exists, with thousands of birds of azure, gold and purple, which sprang on the flowers and let themselves be caught. There were roses, green, black, violet and especially blue."

Most remarkable of all, perhaps, was her religious experience. "From her mother, ardent, imaginative and of a 'simple and confiding faith,' she had caught some of the glow of a fervent piety. Then she suddenly passed into the chilling air of Nohant and the grandmother, a disciple of Voltaire, and equalling her master in cynical contempt of the revered mysteries." Her conflicting religious experiences led her to invent the idea of a new religion "with which nobody else should meddle," and she formed her own private cult with a new divinity, with sacred songs, and ritual, and temple. The name of her divinity was Corambé; and she describes his attributes as follows: "He was pure and charitable as Jesus, radiant and beautiful as Gabriel; but it was needful to add a little of the grace of the nymphs and of the poetry of Orpheus. Accordingly he had a less austere form than the God of the Christian, and a more spiritual feeling than those of Homer. And then I was obliged to complete him by investing him on occasion with the guise of a woman, for that which I had up to this time loved the best, and understood the best, was a woman—my mother. And so it was often under the semblance of a woman that he appeared to me. In short, he had no sex, and assumed all sorts of aspects. Corambé should have all the attributes of physical and moral beauty, the gift of eloquence, the omnipotent charm of the arts; above all, the magic of musical improvisation. I wished to love him as a friend, as a sister, while revering him as a God. I would not be afraid of him, and to this end I desired that he should have some of our errors and weaknesses. I sought that one which could be reconciled with his perfection, and I found it in an excess of indulgence and kindness."

The history of Corambé's existence was developed in a series of sacred books. She composed perhaps a thousand such songs without writing down a line of them. She lived in communion with her deity. While her companions were chattering around her, she could lose herself in her world of religious romance. A thicket of trees and undergrowth formed the temple for this divinity, and she erected an altar, ornamenting it with shells and flowers. Here she enjoyed "delicious reveries," and began to find the pure feeling of a religion according to her heart, until a playmate discovered the temple, when its sacred charm was immediately destroyed.

"From the instant that other feet than mine had trodden his sanctuary, Corambé ceased to dwell in it. The dryads and the cherubim deserted it, and it seemed to me as if my ceremonies and my sacrifices were from this time only childishness, that I had not, in truth, been in earnest. I destroyed the temple with as much care as I had built it; I dug a hole at the foot of the tree, where I buried the garlands, the shells, and all the rustic ornaments, under the ruins of the altar."

III. Educational Aspects of the Subject.

It has been shown that there are great individual differences in respect to the modality of mental images as well as in the ability to combine the raw material of thought. With reference to reproductive imagination five typical classes have been described—the tactiles, the motiles, the visual type, the auditory type, and the normal or mixed type. Of productive imagination there are all degrees from that of the stupidly prosaic child to that of the idealist who lives half the time in a world of make-believe. Some of the writers upon this subject may perhaps have made too much of their classification. The cases cited in illustration are often the extreme and unusual cases; for these show more clearly the types. But however this may be, there are clearly great individual differences both in productive and in reproductive imagination, and these differences are of the utmost importance in education.

In view of the differences in the modality of mental images a number of pedagogical questions arise. Is one of these types of mind better than another? Is one kind of images genetically the primary one, and should the others be subordinated to it? Should the teacher conform his methods to the child's type of mind, using pictures, diagrams, and the like, for the eye-minded; kindergarten occupations, manual training, oral exercises, and the like, for the motiles? Or should the aim be to supply deficiencies and to check any tendency to specialize in one kind of mental images? If the evenly mixed type should be striven for, should we appeal to the different senses simultaneously or successively? In teaching the alphabet, for example, should we, as one writer maintains, first accustom a child's ear to the sounds, then teach pronunciation, and, finally, the forms of the letters; or is the customary way better, where all three operations are carried on at once? Do our present educational methods furnish imagination with the right content and tend do develop the best type of mind? Such questions cannot be answered *a priori;* and there is no sufficient collection of empirical data that would enable us to settle them. A few pedagogical

considerations, some of them suggested by Queyrat, are, however, pretty obvious.

The first desideratum is a set of as definite tests as possible for determining to which of these classes a given individual belongs. Prof. Jastrow[1] has suggested a number of tests, among others the following: The number of nonsense words that can be repeated after a single hearing as compared with the number that can be repeated after a single reading; the number of repetitions required to commit a passage when it is read compared with the number required when it is heard; take two passages of equal difficulty, while the subject reads one let the other be read aloud to him, and note what portion of each he can recall. To determine one's dependence on the motor images of articulation Stricker has suggested this test:[2] Imagine, with partly opened mouth, any word containing labials or dentals, as "bubble," "toddle." With most persons the image is then indistinct; and clearness requires incipient articulation. Of 100 persons questioned Stricker found only one who had no feeling in his lips when thinking of the letters M, P, B.

Beaunis and Binet[3] have prepared an elaborate list of questions to be submitted to painters, with hope of determining the role of images of different modality in their mental life. The list is as follows:

DISTINCTION OF VISUAL, VERBAL AND MOTOR MEMORIES.

(1) Can you easily and clearly represent an ordinary object to yourself, your easel, a flower, a statue, a table, a landscape, the face of a friend? (2) When you try to represent to yourself in memory these common and well-known objects, do they appear to you in a visible form, do you have a mental vision of them? If you try to represent to yourself a forget-me-not, have you clearly in mind the form of the petals and the shade of blue? (3) Or do you recall more clearly the movements of the hand and crayon which are necessary for drawing the form of the flower? Is the representation of a profile, for example, which you call up in memory, a memory of the hand which traced it, and during your act of memory do you make mechanical movements with the hand for drawing the object of which you are thinking? (4) Or again, do you repeat mentally in words the details of an object in memory? For example, suppose you are thinking of the Venus of Milo and that you wish to represent to yourself more particularly the form of the forehead, do you pronounce mentally the word *forehead* to characterize the form of it, or do you see that form directly in your memory? Another example; think of a color — how do you represent it to yourself? Is it a name, a stain, or a figure? A third example; when you think of a word (your own name) does it appear to you written, printed, or do you hear it in your ear, or do you murmur it to yourself in a low voice? A final example; if you add mentally three

[1] Pop. Sci. Mo. Vol. 33, p. 597.

[2] Cited by James, op. cit. II. pp. 63, 64.

[3] Revue Scientifique, 10 Sep., 1892.

or four figures (38+436), do you see the figures, or do you hear them, or do you repeat them mentally?

Kinds of Visual Memory.

(5) Supposing you represent in memory common objects under the form of things seen, please give some details in regard to the nature and character of your mental vision. (6) Do you see mentally everything together or only in details? Can you represent at once a vast scene with many persons, or do you see only a little of a thing at a time? (7) Has this internal vision clearness and stability? Is it comparable to the visual sensation given by objects present? (8) Does the vividness of your image vary according as your eyes are open or shut, or as your look rests on a clear or obscure background? (9) Try to describe exactly what occurs in your mind when you draw or paint from memory. Do you project outside of yourself the image which serves as a model, two metres, for example, or into a corner of the room? Or does this memory remain in your mind? Or, again, do you project it on your paper, do you see it on your canvas, or do you incorporate it into your drawing? Do you have a different process from any of those enumerated? (10) When you desire to recall a drawing, do you attend to it part by part, or do you apply yourself to it as a whole?

Distinction between Memory of Forms and Memory of Colors.

(11) Do you represent to yourself form or color better? When you recall an object, are you more sure of its contour than of its exact shade, or the reverse? Or do you recall the two things with equal exactness? When you imagine any scene, do you see it simply drawn or colored? (12) In a memory which is beginning to fade, is it the color which disappears first or the form? (13) In that which concerns color, do you recall better the color or the intensity? In a whole scene which you recall, the general tone or color of each object? Do you recall more easily exact shades or their relations? Can you represent and draw from memory a common object in profile, front view, and so on?

Fidelity of Visual Memory.

(14) Can you draw or paint complex objects from memory, a portrait for example? Do you know any remarkable examples of this kind of reproduction? (15) Do you recall certain objects better than others—the face, for example, better than a landscape? (16) Certain painters make yellow, violet, brown or gray colors predominate (Ziem, Corot, etc.). Is this due to a prejudice, or to special delicacy of perception for these colors, or to an illusion of memory, or to a particular investigation of the external conditions in which the preferred colors dominate? (17) Do you think there is any relation between the vividness of the images in your memory and their veracity?

The Rôle of Visual Memory in the Arts.

(18) Can you recognize in studying the work of a painter whether he has visual memory developed or not? Is the faculty of painting or drawing from memory more developed generally among certain kinds of painters than among others (landscape, historical, portrait, etc.)? (19) Is it developed among persons who work with special knack? What is the particular gift which these latter persons possess? (20) Do those painters whose works bear a personal mark work especially from a model or from memory?

(21) Is it an advantage to this that, at school, painters pursue exercises on the memory of colors and forms to perfect the education of the eye? We call the attention of artists to the pedagogical interest of this question. (22) Does visual memory in general appear to you a necessary faculty for the artist?

Various Peculiarities.

(23) Have you noticed a great development of visual memory in other members of your family? (24) Have you perfected your own by exercise? (25) Have you had hallucinations of sight? (26) Have you a good musical memory? (27) Have you a memory for places? Do you orientate yourself easily? Can you make the plan of an apartment, a museum, a garden, a village which you have passed through rapidly? (28) Have you good sight? Are you near-sighted? Far-sighted? Are you color-blind? (29) Do you see certain sounds or certain letters colored? (colored-hearing.) (30) Please describe any peculiarities of visual memory which have not been mentioned in this list of questions.

Some of these questions, or similar ones of simpler nature, could be used with older children, and they would serve as a valuable addition to such tests as those proposed by Dr. Jastrow.

Queyrat also suggests certain ways of testing the child's type of mind—its behavior in the presence of different objects, its ability in retaining words, dates, figures, colors, sounds, movements, and so on; and its taste for different studies. He quotes[1] the Spanish philosopher Balmès, who would have the remarkable products of human industry and intelligence placed before the child, maintaining that nature will indicate innate aptitudes which the most attentive study would never be able to discover. An ingenious mechanism, for example, attracts the attention of a group of children. The majority admire it for a moment and pass on. A single one stops and seems to forget himself for a long time. His curiosity, questions and rapid comprehension of the mechanism are signs of his talent. Correggio crying out before Raphael's St. Cecilia, "And I, too, am a painter!" is a case in point. Finally, one may question children in regard to the way in which they remember a page which they have learned, whether they recall the printed words or retain rather their sound; how they perform an operation in mental arithmetic, and so on.

The difference in the modality of their mental images is one reason why many children surrounded by the same conditions of education make such different progress. With any given method, for example, some of the pupils in a class must be handicapped. In a language method like that of Gouin's[2], which

[1] Op. cit. p. 103.

[2] Cf. "How to Learn a Language in Six Months," Review of Reviews, July, 1892.

appeals primarily to the auditory and motor imagination, but which also puts so much stress upon mental visualization, some children (as Mr. Stead's boy has done[1]) may show remarkable progress; but it must not be expected that children with less power of visual and motor imagination will succeed as well. The peculiar form of a child's imagination is sometimes a sign of his fitness for a certain calling in life. In many of the arts, sciences and professions, the power of visualization seems necessary; other studies and callings, like music, require auditory memory; still others, like instrumental music and oratory, demand a talent for retaining motor images; while linguistic studies, especially the acquisition of skill in speaking, require both auditory and motor imagination. The educator's task is to recognize the kind of images which predominate in a child's mind and to adapt his work to the child's talents. There are plenty of cases on record that seem to be illustrations of the wisdom of doing this. Balmès cites the following. Vaucanson and Watt became prodigies in mechanics. They would doubtless have remained mediocre in the fine arts or in poetry. La Fontaine has become immortal by his fables, but his incapacity in affairs is well known.[2]

Certain dangers are connected with the extreme development of images of a given modality. In the case of auditory images, for example, every one has had the experience of being haunted for hours by the persisting memory of some intolerable refrain. Queyrat cites the case of a composer[3] who had unusual auditory imagination. As he sat by his fire and recalled the song of a linnet that he had heard during a walk in the field, he heard a complete symphony — Beethoven's *Pastorale*. Nothing was lacking, although at times the voices of nature mingled with the orchestra. But his marvelous imagination had exasperating caprices. Often for entire days some vulgar refrain of a hand-organ would keep repeating itself. There was no means of escaping from this obsession. Even sleep did not avail; and the more he exerted himself to shake it off, the more it clung to him. The mental image sometimes, instead of persisting thus temporarily, assumes the character of an auditory hallucination. Examples from history are the demon of Socrates, the celestial messenger of Mahomet, the voices of Joan of Arc and Luther's devil. Perhaps the predominance of images of a given modality causes a corresponding species of deliri-

[1] Cf. Review of Reviews, Nov., 1892.
[2] Queyrat, Op. cit., footnote, p. 101.
[3] Op. cit. p. 111.

um. Thus Binet thinks that in the delirium of persecution the patients are usually of the auditory type; for their hallucinations are generally those of hearing — the persecutors are not seen, but heard. Extreme development of visual images exposes to similar dangers. Wigan's painter, whose case has so frequently been cited, after a time became unable to distinguish his imaginary subject from a real one, and was finally sent to an asylum, where he remained for 30 years.[1]

The advantages of the normal type, according to Queyrat, are the diminished danger of hallucinations, and the advantage of not having one's eggs all in one basket in case of cerebral lesion. For example, if visual images are destroyed, as in Charcot's patient, auditory images may take their place. Again, while one of this type may not hope to be a genius of the highest rank in some study requiring specialization in memory of a given kind, he is compensated for this inferiority by the variety of means at his disposal. Queyrat cites some of the distinguished scholars of the renaissance as examples of this type,—Alberti, who was theologian, poet, mathematician, architect, painter, sculptor, etc.; Verrochio, who, while having a preference for sculpture, was at the same time goldsmith, engraver, painter and musician; Léonard de Vinci, who was not only a painter, sculptor, architect, but also skilled in mathematics, mechanics, hydrostatics, music and poetry, was an accomplished fencer, rider and dancer, and a scholar in anatomy, philosophy and literature; also Benvenuto Cellini, who was an excellent draughtsman, goldsmith, enameller, sculptor and a Jack at several other trades. He made his own fire-arms and his own gunpowder, and could hit a bird at 200 paces. He was also an excellent player on the flute and cornet, although he disliked this exercise and applied himself to it only to satisfy his father. The advantages that accrue to those of the normal type are largely the advantages that come from symmetrical development; and the dangers that beset the other classes are the dangers of specialization. One who depends chiefly upon images of a single kind is not only limited in his mental life, but more liable to fall into error, as he lacks the important correctives that come from images of several modalities.

The kind of mental images that shall predominate can be determined largely by education. This has been shown by cases of disease where images of one modality have been destroyed and dependence upon images of a different modality has brought them into prominence in the mental life. A case like that of Charcot's patient shows this. More familiar

[1] Cited by Queyrat, Op. cit. p. 115.

illustrations are the cases of those who have lost one or more of their senses in early life. In the case of the blind, those who have lost their eyesight before the age of 5 to 7 years, according to the investigations of Professor Jastrow, seem to lose their visual imagination. That their education gives unusual prominence to images from the other senses in their thinking is obvious. In the mental activity of a girl like Helen Keller, motor images and images from the dermal senses must play a role which an ordinary person can hardly conceive.

Of course, making certain allowances for hereditary aptitude, that kind of mental images predominates which has been most frequently before the mind. Hence the cultivation of a given sense develops the corresponding form of imagination. It would be interesting to study the effect of prevalent methods in developing one or another type of imagination. Most of the methods now in vogue tend perhaps unduly, as Professor Patrick thinks,[1] to develop visual imagination. Many of them, however, associate visual, auditory and motor images; and some appeal especially to the auditory imagination. Methods of the past made the ear relatively more important than it is to-day. Professor Patrick has shown[2] how this was among the Greeks. "They were a conversing people; we are a writing and reading people. With them poetry was sung or recited; with us it is read. They conducted politics in the agora; we in the newspapers. With them music (including poetry) was the most prominent branch in popular education, with us it is least so." The Jesuits too, with their customs of oral repetition and disputation, have appealed to the auditory and motor imagination.

In modern schools certain methods of teaching language make the ear the special channel of instruction. In teaching the mother-tongue in the schools, the prevailing methods appeal especially to the eye. The special devices—reading machines, reading tablets, cards and the like—serve to give vivid visual impressions. And the general dependence upon books in language-study is well known. But the usual methods are sometimes modified in a way that gives the ear a larger share in the work. A lesson in language described by Dr. Klemm[3] will serve as an example. One of his former teachers "practices analysis and synthesis by placing three bright boys in front of the class, charging one to say *m* (the sound *m*, not the letter *em*) when called upon; the next one *a*;

[1] Cf. "The Rivalry of the Higher Senses," Pop. Sci. Mo. Oct. 1891.
[2] Loc. cit.
[3] Educational Topics of the Day, pp. 245, 246; also European Schools, pp. 7, 8.

and the third *n*. Then by placing them close to each other, so that their shoulders would touch, she makes them sound the word *man* rapidly. The same is done with other words. Now she separates the boys, the middle one remaining in his place, while the others recede toward the right and left, and every time they make a step the word is pronounced over again, thus separating the sounds farther and farther." After this synthesis follows, the boys returning step by step to their former positions and pronouncing the sounds as before.

It is not the purpose of this article to estimate the value of different methods; but the general effect of certain kinds of study upon imagination is obvious. Drawing, writing, manual training, gymnastic exercises, active sports and games, and exercises in elocution develop the motor imagination, while the ordinary book-work in the school appeals more or less to visual imagination. In the subjects of drawing and sketching special exercises can be given to develop visual imagination. Boisbaudran[1] had his pupils draw models from memory; after four months they testified that their visual images were much more distinct and that they could recall them almost at will.

For cultivating the sense of hearing and the auditory imagination the means are also simple. Children should be taught to listen; they should be trained to perceive different shades of sound, to hear distinctly. Instruction in music is of course one of the best means of giving this training.

But without attempting to judge the merits of methods that appeal to the different senses, it may be safely said that in education we should use as many avenues to the mind as possible—eyes, ears, hands, vocal organs, etc. There is a strong feeling also that our education neglects the motor side. It has been passive rather than active. Manual training and physical education, not to mention the forms of active education upon a higher plane, are not merely useful as means for preserving health and the like, but they are means for developing a distinct type of mind, one in which motor images play a greater part.

Beyond pointing out certain dangers that may beset those whose dependence upon images of one modality is extreme, and beyond stating certain obvious advantages of the normal type, little can be said of the relative merits of the different kinds of reproductive imagination. But it cannot be doubted that the differences in reproductive imagination are of fundamental importance in the mental life. Even one's temperament and character may be affected by the kind of images

[1] Cf. Queyrat, op. cit. pp. 147, 148.

that predominate in his thinking. Mr. Fraser's studies have suggested that even one's philosophy may be profoundly influenced by the modality of his imagination. And Ribot has attempted to extend this study to concepts and general ideas, and to determine whether there be not individual differences in the way that different persons represent concepts, and if these differences be not reducible to certain fundamental types. Tests of more than a hundred persons have shown striking individual differences, and indicate that the type of one's reproductive imagination may determine the form of his abstract thinking.

It is equally important to differentiate instruction in view of the individual differences in productive imagination. With some children it may be necessary to check imagination. With others the effort should be to develop it. And it is well to remember that most children have sufficient imagination to vivify what is dull, prosaic and dead to us. What you tell a child of wolves and bears, of tramps and robbers, of the dark forest and the all-devouring sea, of giants, ogres, angels, devils and future punishment is not apperceived in the dull prosaic way in which you tell it; but it grows appalling in that vivid ideal world in which it finds lodgment. The whole subject of religious education especially, should be studied in relation to the child's productive imagination. The religion of George Sand or of Waldo in the African Farm is but an exaggerated description of the religious experience of many children. The plays of children also should be studied in their relation to the development of imagination. Simple plays and toys are often the best; for they give scope to the imagination, and the importance of play is conditioned largely by the share of imagination in it. Jean Paul has put this well in a brilliant passage.

"In the first place," he says, "the child plays with things, consequently with himself. A doll is to him a nation, or a company of players, and he is the theatrical poet and director. Every bit of wood is a gilded flower-rod, on which fancy can bud hundred-leaved roses. For not merely to grown-up people but also to children, the plaything itself becomes indifferent if a happy imagination alone is permitted to decide; whether it be with regard to imperial or laurel crowns, shepherds' crooks, or marshals' staves, the flails of war or of agriculture. In the eyes of wonder-working fancy every Aaron's rod blossoms. As the Elysian fields of the ancients near Naples were grounded (according to Maccard) on nothing more than a bush in a cave, so, for children, is every bush a forest; and they possess that heaven which Luther in his table-talk promises the saints, where the bugs

are sweet-scented, the serpents playful, the dogs gold-skinned and Luther a lamb. I mean to say that in the heaven of childhood the father is God the Father, the mother the mother of God, the nurse a Titaness, the old servant an angel of the communion, the turkey a cherub of Eden, and Eden itself is restored." . . . . . "Never forget that the games of children with inanimate playthings are so important because for them there are only living things; a doll is as much a human being to a child as a baby is to a woman; and also because to them every word is a reality. In beasts the body alone plays; in children the mind."[1]

Here in a child's imaginings is a vast fund of spontaneous interest. How to utilize it; how to check imagination when extreme without wasting this spontaneous interest; how to develop imagination when deficient—in a word, how to adapt education to individual differences in productive imagination —such are the teacher's problems. These questions have not been satisfactorily answered, and only by the patient study of many children and of the effects of various methods of education can a satisfactory answer be obtained. But modern education has recognized one fact: God has made men different. It is the merest platitude of every-day philosophy that there is infinite variety in the talents and in the deficiencies of human beings. Teachers must study the individual differences in their pupils. But the present problem is, should education aim to remedy nature's defects or to develop innate talents? This alternative meets us everywhere. The questions of general culture vs. specialization, of the elective system in the colleges, of the differentiation of the courses of study in the lower schools, generally come to this when reduced to their lowest terms.

Psychology has rightly confined its study hitherto chiefly to the primary and universal in mental phenomena and has neglected individual variations, but educational psychology must make special study also of the individual. While general psychology is fundamental, and while no one can succeed in teaching a class unless he can appeal to what is common and universal in child-nature, it is likewise of the greatest practical importance to lay stress upon individual differences; for we are apt to suppose the mental operations of other people precisely like our own. The visions, number-forms and the like found by Galton are almost incredible to those who do not have them. "The number-forms of different persons are mutually unintelligible." But the seers are like the color-blind. They think everybody

[1] Richter's Levana, p. 85.

else has the same way of regarding things as themselves. So educators find one method that suits minds of their own type perhaps, and forthwith they announce it as *the* method. Careful study of the effect of different methods might show that no method has ever been employed that had not some good in it for some individual; but it would also show that no method (except in its general principles) is of universal application.

THE PHYSICAL EDUCATION OF WOMAN.

By Prof. A. Mosso.

Translated by A. F. Chamberlain, Ph. D.

This address was delivered at the closing session of the "Society for the Education of Woman"—whose meetings were held under the patronage of the Queen of Italy, who honored them with her presence—by A. Mosso, professor of physiology in the University of Turin. The translation is made from the report of the address in the "Boletin de la Institucion Libre de Enseñanza," Madrid, for August 31, 1892.

I.

The physical education of woman is, in many respects, more important than that of man, and lately it has attracted the attention of men of learning in particular on account of the active opposition offered to the introduction of German gymnastics into the schools. The obstacles to be overcome in introducing a reform in the physical education of woman are, perhaps, less than if the education of man were concerned. In the case of the former, in fact, it is not required that gymnastics should be a preparation for military service, or that the school-mistress should know how to shoot, or that the pupils should practice acrobatic exercises, and there is, therefore, greater hope that the physiologists and hygienists may be able to exert more efficaciously their beneficent influence.

Gymnastics are generally considered from but one point of view, viz., their use in developing the muscles, whilst their utility with respect to the organs is little thought of. It is to this other most important aspect of physical education, which consists in the gymnastics of the viscera and of the functions, that we ought to give greater importance.

In Italy we begin physical culture very suddenly and we relinquish it also too suddenly. The most favorable age is from 14 to 24 years, the very period in which with us least exercise is taken. Physical culture is perceptibly declining. I know not a few cities in which now the youth take much less exercise than twenty or thirty years ago. It seems that with the calming down of the enthusiasm, which led us to the reconstitution of our country, goes also the debilitation of physical education.

Young ladies despise gymnastics because they think it child's play. In the technical schools, in the gymnasia, and in the lyceums, we have seen that compulsory measures do not serve to diffuse German gymnastics. Let us grant the existence of societies for physical culture, destined for picked men and for those who possess better natural gifts, but let us seek another way for those less strong and vigorous, those for whom movement and exercise are necessary in order to make them robust. Before all, we ought, in a good

method of physical education, to persuade the mothers that the health and future of their children are at stake.

Prof. G. Bunge[1] has met with recently one of the causes of anæmia and chlorosis in girls. Their bodies, in the years of puberty, ought to store up a great deal of iron, as a treasure of the most precious element of the blood, which nature keeps in reserve and which the mother will transmit to her child. And as the milk does not contain a quantity of iron sufficient for life, the mother must give to the child before birth an excess of iron. It is a physiological necessity which may be converted into a morbid act. The organism, compelled by the regulating forces to seek the iron which it will afterwards need, blindly consumes the blood, if it is not had promptly. Woman ought, with greater care even than man, to keep active her digestive functions, because the development of her body is more delicate than that of man, and the appearance of the signs of maturity is marked by graver symptoms. The fact that malnutrition, excessive mental work, depression of mind, great debility, convalescence, arrest maturity, is of itself sufficient to convince us that we ought to redouble our vigilance to make sure that during the period from 14 to 15, there be no lack of exercise and that the woman is maintained in a condition most favorable to physical development. The idea put forward by some that about the age of puberty there ought to be a long period of repose, has not found acceptance amongst the physiologists, who recognize, on the contrary, in activity one of the causes most efficacious in promoting the circulation of the blood and the nutrition.

Hysteria, about which there has been so much discussion, is a degeneration of the nervous system fomented by sedentary life. It is a sad prerogative of woman and of feeble men; it is a malady which is now looked upon as a condition of permanent fatigue. We ought to prevent it by vigorizing the organism by means of fatigue. Exercise, light and the open air frequently succeed in curing it by vigorizing the nervous system. If we see girls who are all the time sitting down, who are pallid, who have large bluish circles beneath their eyes, who are inattentive and distracted, who complain of night-mares which exhaust them, who have nervous perturbations of the respiration and of the voice, who have a tardy digestion, who present very rapid changes in mental states, passing suddenly from mirth to melancholy, from laughter to tears, from habitual pallor to excessive color, we ought firmly to intervene and not to permit these young girls to give themselves up to a repose that is enervating them. It is a question of stopping them on the fatal descent which is leading them to hysterics, of withdrawing them from the artificial emotions of society and suppressing exercises which discompose and fatigue the nervous system; it is only the open air and constant exercise that can vigorize these fatigued organisms. We ought, therefore, to make physical culture more attractive by means of plays, to increase the palestras, and to make it so that girls meet with all sorts of facilities for moving and growing under more physiological conditions.

II.

There are in Italy persons of authority who think that a gymnastic movement, in order to be useful, must be executed with much energy and rapidity. Imbued with a military spirit, they seek a physical culture of quick, vigorous, impetuous movements. Judged by a soldier, a rapid movement may seem preferable, because of its

[1] Lehrbuch der physiologischen Chem'e. Leipzig, 1889, p. 99.

decisive action, but the characteristic step of a Prussian soldier and his manner of handling his gun are things which neither the physiologist nor the artist can admire, and are certainly not suitable for female physical culture. In the movement of the muscle, in its flexion, moreover, which is a chemical phenomenon, there is a mechanical action which is useful to it. We are reminded in this connection of the ancient customs which the phlebotomists had of putting into the hand of the patient the lancet-case and making them compress and turn it round and we could persuade ourselves that a slight movement of the muscles is sufficient to facilitate very much the flowing of the blood.

Athletes before wrestling used to prepare themselves by rubbing with oil and when they came out of the struggle exhausted they were re-invigorated by rubbing. These things, I say, are as old as medicine. A century before Christ, through the work of Asclepiades, the doctrine of the beneficial influence which passive movements exercise over the muscles was already demonstrated and accepted by physicians. Even without causing the muscle to contract, we can by means of massage (amasamiento) succeed in making it plumper and stronger. In this connection there have been made recently in my laboratory by Professor A. Maggiora[1] important experiments which show with seeming conclusiveness that, in physical culture, one of the most useful effects is due to the passive action which the muscle exerts upon itself, and that with slight movements, better even than with prolonged and vigorous movements, the lymph and blood are set in motion. Constant and moderate exercise is what favors the development of the muscles; impetuous movements improve it much less. The Swedish system of physical culture obtains good results by following a method completely distinct from ours. I do not say that we ought to copy, just as it is, the Swedish system, but we must, nevertheless, recognize that some of the principles upon which it rests are more conformable to physiology than those of the German system.

To many the idea of taking anything from the Swedish system is repugnant, as if these were the only foreign things or because it has a medical tendency. But we ought to remember that, in the matter of physical culture, nothing has been discovered since the classic times of Greece and Rome. When I feel the necessity of rousing my mind from the reading of modern books, whose number is so great, but few of which contain any novelty of thought or variety in form, I take up Philostratus'[2] book on gymnastics, now twenty centuries old. The ancient physicians prefer Oribasus, who was the friend of the Emperor Julian, the apostate. Oribasus and Julian are two great figures extending like a glorious lustre over the classic world, when the darkness of barbarism is setting in. The Emperor Julian had conceived the hope of saving the empire from its deadly throes and of leading it on to new grandeurs. In Milan he left the insignia of the philosopher and girded on his sword to hasten to the frontier of Gaul to conquer the Germans and Franks. These were the last victories of Roman civilization; and whilst they were fighting, Julian carried with him to the battle-fields his library, and Oribasus wrote the encyclopedia of medicine, the last and greatest monument of ancient science.

Oribasus left several chapters which comprise modern gymnastics, including the principles of the Swedish system. The same rhythmic steps which are now one of the characteristics of modern methods

[1] Ricerche sopra l'azione fisiologica del massagio sui muscoli dell' uomo. Archivio per le scienze mediche, Vol. XVI. (1892), 41-77.

[2] Philostrate, *Sur la gymnastique*, publié par M. Mynas, Athènes, 1858.

we meet with already in Oribasus, but there are there also many other useful things which we might turn to good account in practice. Oribasus distinguishes movements that are *rapid without intensity or violence* from *vigorous or strength movements*. We might accept this fundamental distinction as the basis of modern gymnastics. First, exercises in the contraction of the muscles pass from one group to another without stopping; then, when the muscle is already near its complete development, that is, after about the fifteenth year, more vigorous exercises; but even in this we ought to proceed with caution and methodically. In modern gymnastics vigorous or strength exercises consist almost always in raising the weight of the body with the arms. Many think that, in order to develop the strength of the muscles, this great labor is necessary. This is an error. I believe, on the contrary, that for vigorizing and developing the muscles, contractions of little duration, in which is put in motion a weight less than one-tenth part of the body, are more efficacious. Such are the exercises with broom-handles and clubs. I have made with Dr. Manca a series of investigations on gymnastics by means of such aids with girls of from 8 to 13 years. The result has been that fifteen days of exercise suffice to double and treble the strength of the arms. I do not believe that in the efforts which are made on the horizontal ladder and other apparatus an equal result can be obtained, because, in lifting the whole weight of the body, the muscle acts under less physiological conditions.

The gymnastics for women should never be a gymnastic of strength.

Recently I have seen in London how much advantage can be derived from the Swedish system. Miss Chreiman, well-known as a writer of eminence on female education,[1] carries eclecticism so far that she has introduced into her system some movements taken from the Spanish dances.[2] Cadenced movements, well-selected, slow contractions which give artistic postures to the body, have a great future before them in the physical education of woman.

Instead of giving an order for each movement, we ought to prefer the series of movements and to direct them with a physiological and useful purpose. Think of the difficulties which mothers encounter in teaching their daughters to move gracefully. For a girl to move elegantly implies a complete study of the co-ordination of movements. Our girls, from being idle so much, acquire the tendency to shrink the shoulders and to walk with the back somewhat bent and the head a little inclined.

A book on the physical education of women, in order to be useful, must be rational and classify exercises according to their physiological importance, placing first of all those which are indispensable and indicating, likewise, those which may be omitted ;above all it ought to be written in a pleasing, readable style. Unfortunately, up to the present in Italy no such books have been written, and of all our school-mistresses may buy, there is perhaps not one suitable for mothers and young girls.

III.

One mistake in physical culture consists in employing the same method and the same apparatus for both women and men. In the case of the former, the muscles of respiration and the muscles of

1 (a) The Scientific Physical Training of Girls. A Lecture. London, 1884. (b) The Physical Culture of Women. A Lecture. London, 1888.

Formerly in Spain, the young ladies were taught the national dances, e. g., the *Bolero*, as a means of developing flexibility and grace in movement. [Note of the Editor.]

the abdomen are much more important than in men. In their lives women have terrible moments when weakness in the contraction of these muscles prolongs the labor of a mother and sometimes causes her death. The German system, which was invented by soldiers, has not taken into account the necessity of woman, and does almost nothing for the muscles of the diaphragm and abdomen, even when there is a series of exercises put forward as absolutely necessary.

In books on physical culture written with a practical end in view, such as that of Schreber,[1] of which already twenty-four editions have been printed, we find many exercises for such purposes. Schreber recommends falling to the ground upon a thick rug; crossing the hands behind the head and raising oneself to a sitting posture, then letting oneself fall backwards again. This is one of the best exercises for exciting the muscles of the abdomen and of its walls. But there are many other ways of training the muscles of the abdomen without apparatus. It is sufficient to sit on a bench and then having secured the feet under some article of furniture, to stretch oneself backwards, raising oneself up again. The training of the abdominal muscles can be had in running and climbing a sloping lawn or meadow. Any physician can improvise in a house, in a meadow, or under a shed, the apparatus necessary for these exercises, which are of the greatest importance in the physical culture of women.

It was Philostratus who said that the strong man ought to have a "vientre hundido." When the training of the abdomen has gone on for some time the strengthened muscles remain in a permanent state of tonicity, which favors the functions of the intestines and of the female viscera.

We must not be too pedantic and prescribe by means of programmes such a uniformity as will stupefy the teachers and stifle all initiation in the pupils. Having given a physiological direction to gymnastic movements and having demonstrated their utility, let us give them a little more freedom. In England, plays are not exactly equal in all parts; even in the same play there are notable differences, which are in no way prejudicial. What is lacking with us in Italy is the desire for physical culture. Let us first of all try to inspire a little enthusiasm for physical education and afterwards we may think of generalizing it throughout the kingdom.

A few examples will suffice to show, if indeed it were necessary, how difficult and wearisome a thing is the physical culture of today. The elementary movements are insupportable and seem made to cause recruits to despair. In 1838 Colonel Amorós said:[2] "Frenchmen would get tired of doing them and would perhaps make fun of them." Notwithstanding this the authors of treatises go on copying one from another the elementary exercises, and in the most recent of the Italian treatises I find even the rotation, gyration and flexion of the head.

Movements of the head in all directions are habitual to such an extent that I know not why children should be obliged to make them to time and measure.

After having spoken of the "flexion of the head forward, backward, to the right and to the left, alternately, in order to be efficacious (thus it is written in the book), all movements of the head must be executed with energy and intensity, excluding any rapid or vigorous movement."

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[1] Gimnastica domestica medica ed igienica per ogni sesso ed età, con 45 figure, Milano Treves.

[2] Nouveau manuel de l'instruction physique. Paris 1838, Tome 1, p. 27. [For an account of the works of this celebrated Spanish gymnast, see this *Boletín*, numbers 276, 277. Note of the Editor.]

This is mere logomachy ; here are words which annul one another and expressions which I humbly confess I am at a loss to comprehend. All this but serves to create confusion, to waste time and make gymnastics wearisome.

The flexion of the arms and of the legs, jumping with the feet close together, changing step, walking on tip-toe, looking up or down, to the right or to the left, are things that our boys and men do for themselves every day and I cannot see what necessity there is for placing them in file to do so. On the other hand many useful and necessary things are lacking. The reason for this is that we have copied the German system of gymnastics, which is essentially a parade one.

Some exercises now prescribed in the programmes, besides being useless, are even prejudicial. Amongst these is the vigorous marking time with the foot, which has the effect of greatly increasing the flatness of the foot. A foot, to be beautiful, ought to have inwardly between the heel and sole where the toes are, a semi-circular arched part. At bathing-places by the sea, by looking at the tracks left by the ladies in the sand, one can see what well-formed feet are. The narrower the instep region, the more perfect is the foot. We physicians can tell if the foot is more or less arched by simply observing the individual's way of walking ; those who turn the feet a little outwards in walking have a tendency to flatness. This form, when much accentuated, constitutes a defect which exempts from military service ; for, through the inward part of the sole pass the arteries and nerves, and if the elevated arch of the normal foot is lacking, it is less suitable for marching.

Dr. Charles Roberts was the first to note that this defective form of the feet tends to generalize itself more and more. We ought, therefore, not only to exclude this exercise, but also seek others by which with the excitation of the flexor muscles, the back of the foot may be made higher.

Another defect of female gymnastics is that almost no attention is paid to the vigorizing of the muscles of respiration. This was not the case with the ancients. Oribasus,[1] after having written a chapter "on the different sorts of exercises and their efficacy," and another "on the method of exercising," wrote two on the gymnastics of respiration, which was then called *apoterapia*. This was the last part of the methodical exercises. It consisted in holding the breath and whilst a strong contraction of the muscles of the thorax took place, those of the abdomen and of the diaphragm were relaxed. Then the inverse exercise was practiced, *i. e.*, the viscera of the abdomen were compressed by means of the diaphragm with the simultaneous contraction of the abdominal walls.

A little group of English girls can scarcely come together before they organize a game. Often those who travel through Italy carry with them their rackets and balls. Our girls, as if they were living in a convent, are seen to walk composed and grave, almost afraid of setting down their feet, terrified by a monastic vigilance which paralyzes them. In none of the institutions which I have visited, and they are amongst the very best, have I met with lawn tennis. The Italian woman of the renaissance used to play ball, as we can see in the frescoes of the castle of Ferrara and of the Borromean palace at Milan. Now it would never occur to an artist to represent girls at play, for that is a thing that is never seen.

Some institutions for female education, which I have visited, have left in my mind a sad remembrance, which I never shall forget. It is a humiliating fact that we deny to our young girls the air, the

[1] Œuvres d'Oribase, traduction de Bussemaker et Daremberg, Tome I, p. 473.

light, the sun, the room which we so freely[1] grant to our state prisons and houses of correction. In Italy, the physical education of woman will continue as abandoned as it is to-day and for a long time, unless a propaganda in favor of games is begun. Let us imitate the example of Germany, which, even though it be the birth-place of modern gymnastics, is now engaged in a great movement to complete them by means of games. In the month of June next, there will be given in Prussia two special courses for teaching games to school mistresses, one in Berlin, the other in Brunswick. Let us, too, institute our courses of games for teachers and above all let us publish a book of games. There is no difficulty in collecting the Italian games, and we can add the foreign ones that are lacking to us. Commencing with the book of G. Beleze,[2] and coming down to the last few years, we meet with remarkable progress in foreign countries. I will mention, amongst others, that of Major Docx,[3] which I have recently seen put into practice in the schools of Belgium.

In France and in Belgium the clergy have at once understood the tendency of the evolution of gymnastics and a book of games written by two Jesuits has quickly run through three editions.[4]

IV.

There has been so much talk of the biological and psychological differences between man and woman, and such diverse and opposite applications of these have been made by students of social science, that I feel almost obliged to give expression to my opinion as a physiologist. There have been fathers of the church who denied to woman the possession of a soul. The canonists wrote: *Mulier non est facta ad imaginem Dei;* and since then many philosophers have continued to speak ill of woman. In this very series of meetings and lectures, Prof. Sergi[5] made the synthesis of the pessimistic school. The differences pointed out by Prof. Sergi, whose value in the field of anthropology and psychology I am the first to recognize, do not depend, it seems to me, on the primordial constitution of woman, but are the result of the artificial atmosphere which the life of society has created around her. To judge of woman, we must study her apart from the special conditions in which man, who has enslaved her, brings her up; we must consider woman in an entirely free state of nature, where she represents a specific form of the zoölogical series.

Let us take for purposes of comparison the most intelligent and affectionate of animals, the horse and the dog. We all know that the physical strength and the activity of the nervous system are equal in the male and female. The lioness is feared more by the hunters than the lion, and it is the same with the tiger, the panther and the other higher animals, who might have disputed for the lordship of the earth had not man appeared.

There are various reasons which make it difficult for me to accept the opinion gravely expressed by Prof. Sergi[6] that "woman, morphologically and functionally, does not reach the normal development of man, but in general remains behind, as if there were a general suspension of development." It seems to me that the human characteristics and fundamental differences which dis-

[1] This "freely," of course, refers to Italy. [Note of the Editor.]
[2] Jeux des adolescents, Paris, Hachette, 1856.
[3] Guide pour l'enseignement de la Gymnastique des Filles. Namur, 1882.
[4] De Nadaillac et G. Rousseau, Les Jeux de Collège. Paris, 1891.
[5] Per l'educazione e la coltura della donna, en la revista "L'Educazione Nazionale," anno III, 9 aprile, 1892.
[6] Loc. cit. Par. II.

tinguish our bodies from those of the lower animals are essentially feminine in their nature.

It has been said that the cerebrum is the organ which marks like a gulf the difference between man and the animals, but this is not certain. There does not exist any profound anatomical difference between the cerebrum of the gorilla and our own, and even in function the difference is only in the greater extension of the psychic phenomena, not in nature and characteristics. The great morphological difference between the animals and man is in the form of the pelvis. No physician can, even when looking at it from a distance of twenty paces, confound the pelvis of man with that of any other of the anthropomorphic apes.

The pelvis of woman is a new type of skeleton appearing on the earth. Hitherto we have sought in vain the animal which should supply the missing link between us and the lower animals, and singularly enough, the pelvis of man, more than that of woman, resembles the pelvis of the simians in being narrower and higher. If it is certain that walking upon two feet is one of the characteristic signs of the genus homo, woman is certainly better constructed for not walking bent towards the ground, and the female type must preponderate in the human type. Other characters of femininity appear in man in the mammary glands, which serve no purpose, and in the muscles of the abdomen, which are more useful to women. Besides these female characteristics, man has others, as the abundance of hair, which approaches him more to the lower animals. To engender a woman more favorable conditions are necessary than for the formation of a male, because the embryo of the female represents a greater vital potentiality. In the case of bees only the non-fecundated eggs produce males. Statistics show that when the conditions of life are unfavorable a greater number of males are born. With man, as with the lower animals, the males die more easily than the females. In France, for 25 years on, the probable duration of life is, for the woman 39 years, and for the man only 37 years[1], and this in spite of the fact that woman, by reason of her physiological functions, is subject to a greater number of infirmities than man. Some authors, while admitting that the cerebrum of woman can function as well as that of man, add, nevertheless, that if woman wishes to completely preserve her femininity and not to injure her function as mother, she ought not to enter into competition with man in the intellectual field. The division of labor is certainly useful in society and thus man obtained the supremacy and woman finds herself in unfavorable conditions. But it cannot be said that the activity of woman in the intellectual field is at the cost of her femininity.

Recently Mrs. Henry Sidgwick[2], sister of the celebrated physiologist Balfour, published a very careful statistical investigation concerning the women who have studied in the universities of Cambridge and Oxford. This lady collected documents full of details relating to over 562 women of the various university colleges, and the facts came out that the women who have attained to academical degrees had in their marriages afterwards a more numerous progeny than that of their sisters, and that they were physically superior to the general average of English ladies[3].

But we must not forget the difference there is between physical education in England and Italy. To her education the English

[1] Victor Turquan, Manuel de statistique pratique, Paris, 1891, p. 487.

[2] Health statistics of women students of Cambridge and Oxford and of their sisters. Cambridge, 1890.—Mrs. Sidgwick is the wife of the well-known philosopher, Prof. Sidgwick, and has just succeeded Miss Clough as head of the famous Newnham College, at Cambridge.—[Note of Editor.]

[3] Loc. cit. p. 91.

woman owes her greater development, agility and robustness. Looking at the caricatures of the illustrated periodicals of France and of England, one recognizes in the exaggerations of the profile of woman how different are the types which are now in vogue in these two countries. The sketches of *Punch*, in which the figures of women, drawn by Maurier, by Keene and by Furniss, are taller, more muscular, and I might almost say stronger than those of the men, form a complete contrast to French caricatures.

V.

We to-day have an idea of beauty distinct from that which the Greeks had. Some things which we believe necessary in order for a woman to be called beautiful remind one of the prejudices which dominate the æsthetics of the middle ages. I think Schadow was the first to observe that the Venus de Medici had feet longer than the normal, and to show how the thorax of woman in the Greek statues is larger than that of the modern woman. The Venus de Milo, in the proportion of its members, is a giant among women, and has in its muscles characteristics which make it resemble the celebrated statue of the Athlete of Policletus. Even the Venus of Cnidus, in the Vatican, has a masculine stature. In the axilla of these Venuses can be seen the muscle for insertion into the shoulder, a salient characteristic, which at times is wanting even in strong men. But it is particularly in the modeling of the abdomen that the development of the muscles is most evident. The models for the Venus of Cnidus and the Venus of Milo must certainly have been women trained in gymnastics and games. The rectal muscles of the abdomen are clearly seen; the upper part of the belly as far as the navel is divided by a line in the middle and on one side, and on the other are seen two furrows marking the outer margin of the rectal muscles. I have not seen a modern statue in which this great development of the abdominal muscles was so well indicated. Only in some master-pieces of Michael Angelo and Cellini can we admire these physiological peculiarities of the classical woman.

There are young ladies and mothers who fear that by practicing physical culture they will make their arms too corpulent. A rounded arm is not beautiful; it may be pleasing, but it is not artistic. The exercise of the arms causes the fat to appear a little, and then the muscles in the state of repose are not flaccid, but let their form be discerned beneath the skin. We have on the shoulders a triangular muscle called deltoides. This muscle is to cover the bones of the shoulder, descending in a visible manner till it inserts itself on the shoulder. The biceps, too, the muscles which we see increase in volume when we bend the elbow: this muscle ought to be seen as well, if the arm is to have a perfect form. Artists agree in recognizing that the women of the Montes Albanos have the most beautiful shoulders. During the whole renaissance there was such a profuseness of superb shoulders that many connoisseurs maintained that our art excelled the Greek art of the classic epoch, in which the shoulders were less beautiful. It is sufficient to refer to the women which Raphael painted in the picture of the Transfiguration, the drawings which he made for the vault of the Farnesina and his fresco of Galathea. The shoulder development and the majestic walk of the women of the Montes Albanos are considered insuperable, and are owing to the habit which they have of carrying heavy things on their heads and often keeping the hands raised to keep them in place. I am not the first to note these facts and to indicate the direction which ought to be given to female gymnastics in order that girls may learn to walk straight and with a noble step.

Thus, for example, instead of making motions in all sorts of directions, which is inconvenient on account of clothing, it would be much more useful for them to catch with their hands in leaping at an object suspended above their heads.

Ernest Brücke, professor of physiology at Vienna, one of the most distinguished scientists of this century, whose death occurred but a few months ago, published last year a book entitled, "Beauties and Defects of the Human Body."[1] It is a classic in its profound knowledge of anatomy and physiology united with great artistic skill. Brücke, speaking of the insertion of the neck and of the muscles seen in the posterior portion of the shoulders, says: "Celebrated for the beauty of these forms, and for the insertion of the nape of the neck, are the Roman girls and women, especially the chocharas. Rounded necks, like those of the ancients, I have often seen in Tuscany." Speaking of the thorax he says to the German artists: "There is no trust to be placed in the models now in vogue generally, especially with us in Germany, for the German thorax is much more frequently badly developed than the Roman." Then he makes a comparison between the abdomen of northern people and that of those of the south; he speaks of the form of the head, of the jaw-bone; and in his æsthetic criticism he always shows his sympathy and admiration for the physical characters of our race. It is fitting that the Italian women should jealously guard this inheritance. It was a slow selection that has perfected our race, and physical education ought to strengthen and preserve this superiority.

It is an exaggerated belief that the Romans did not acquire until the last centuries the æsthetic sentiment of Greece. The Romans always had a great admiration for corporeal beauty. Without this sentiment, the Scipios in one of their tombs now to be found in the Vatican, that of Cornelius Lucius Barbatus, who conquered the Samnites in 300 B. C., would not have praised the beauty of his body which, according to the inscription, was equal to his virtue. The saturnine verse runs:

QVOIVS. FORMA. VIRTVTEI. PARISVMA. FVIT.

Times have changed so much that to-day, in the very same Rome, we may not or cannot say to a woman that her beauty of body is equal to her accomplishments.

[1] Schönheit und Fehler der menschlichen Gestalt, Wien, 1891.—He is also the author of essays in the Bibl. Scient. Internat. Paris, 1878, on "Principes scientifiques des Beaux-Arts, etc.—[Note of Editor.]

MIRROR WRITING AND LEFT-HANDEDNESS.

By M. Strack.

N. M. is a slender boy, now (July, 1892) fourteen years old, a little below the average stature and weight for the age, complexion somewhat sallow, dark hair, blue eyes which lack expression; he moves with moderation and slight unsteadiness of gait. He can do light work and plays at marbles and other childish games. The parents are of German birth, plain, laboring people, well built, strong and healthy. Their children are six boys and one girl. One older brother exhibited marked indistinctness of speech in childhood, which he has outgrown.

But in N. there is a combination of traits making him an extremely interesting subject, physiologically and psychologically. There is marked left-handedness which no other member of the family exhibits; he cannot pronounce a single word clearly, although the organs of voice are perfectly formed, and he makes sounds in his attempts to speak. There is total aphasia. He began school at the age of nine years. His progress was slow, but as hearing and sight were normal and active, it could not be doubted that the mind was unfolding. After a few months at school he began attempting to write at the blackboard and on paper. The left hand was used, being moved from right to left; each letter was reversed, and the letters placed in reverse order. Viewed in a mirror held before them, his early efforts were not more illegible than those of other children learning to write. With more exercise of the muscles the letters came to be well formed and fairly regular. If words he could spell were pronounced to him, they were put down in mirror writing; if required to copy written or printed words his copy was reversed. No effort was made by his teachers to induce direct writing, but he acquired it probably by imitation; at what time is not known. After being in school three years he wrote from dictation and from copy in direct hand such simple sentences as, *The man has a pen*. He also wrote the numerals from memory, but very laboriously, as if they were recalled with effort. They were not set down in their order and the 4, 5, 6 were plainly reversed. Words written in the reversed hand were shown him at that time; he tried to pronounce them and evidently understood their meaning.

Owing to timidity and ill health his attendance at school has been irregular. His present attainments are summed up in this: He recognizes at sight the words of Harper's First Reader, Part I., and can write most of them at dictation. His phonetic sense is so well developed that he distinguishes the most common vowel sounds and connects them with their marks for pronunciation; recently he wrote with his class ten words, as *horse*, *shells*, marking correctly the vowel sounds. Of numbers he seems to have no conception. His attempts at articulation are nearly as futile as at first, though his mother asserts that she understands them. At a test given him

last winter the printed words *red*, *yellow*, *blue* accompanying those colors were shown him. Upon request he tried to write them upon the board in direct order, but his letters were cramped and the words sloped at various angles. Finally he wrote in clear characters from right to left

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The following illustrations show his inability to originate ideas and to put them on paper. At request he wrote his own name reversed, misspelling it; he could not write his age. At the request to put down some numbers he wrote $2\times3=$, $7\times5=$, all being reversed. Shown a card of colors, such as makers of paints issue, red was pointed out, the name being covered, and he was asked to write the name; he could not do it, nor the name of any other color. At last he wrote with a pencil, imitating the type of the card,

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While he originates nothing on paper, he can do something more than follow the directions of others. He knows his rights in a game of marbles and will endeavor to assert them by the voice. He gives evidence in other ways of simple ratiocination. There is no hemiphlegia nor paralysis, sensory or motor. The right hand and arm are as large as the left and capable of as strong a grasp; they are used somewhat, but the pen is always taken in the left hand, and no effort has ever been made to get the right hand used. It is to be regretted that no specimens of his drawing were taken early. Not long since he drew a cup placed on the table before the class; the outline was fairly done and the handle shown on the proper side.

Recently another case of mirror-writing has come under my observation. A girl, P. R., ten years of age, entered school September, 1891. She has a bright, pleasant face, and senses and speech are normal. I cannot learn of any congenital defect, or that she has ever suffered from serious disease. It is said that the father was at one time subject to fits, probably epileptic. It soon became apparent, however, that the girl was not tractable. She knew few words, had no comprehension of abstract numbers and wrote only a little. Being so backward she was placed in a class below her years; this aroused no sense of shame; she seemed quite regardless of the opinion of others. Commands were obeyed mechanically, to be entirely ignored in the next hour. Reproof was met by a stony stare or even a placid smile. Her attendance was irregular and the slightest indisposition sufficient cause for absence. The parents seemed to allow whatever she desired. She is also left-handed and her teacher noticed when she began to write that she wrote reversedly. She was at once required to trace a copy written for her. After a short time she wrote the direct hand nearly as well as the reverse, and at this time she writes both with about equal skill. In her exercise she now writes from left to right, and uses the reverse script only when requested to do so. There has also been increased pride in her work and general improvement in conduct. She never attempts to use the right hand in writing.

Before considering the rationale of this process, a few observations upon the use of the left hand by children in writing will be reported. It is believed these throw some light upon the more abnormal forms; and also that the mirror-writing will help to a better understanding of the difficulties in the way of ordinary left-hand penmanship.

In a large number of cases observed wherein children were learning to write with the left hand, in every case there was something unusual, either in the movement of the hand or its position on the paper.

M. M. is a bright boy of eight, left-handed. In writing he inverts the paper, the top of the sheet being nearest the body; the arm is then flexed so that the fingers point toward the top of the page; in this position the movement is from right to left, thus securing direct copy, legible but irregular. The movement is as difficult to understand as in mirror-writing. On the blackboard he wrote for me, with the left hand and the right, his name and the numerals, with other words from copy and dictation. The 3 and 5 were reversed when written at dictation with the right hand, the 5 only with the left, 10 with the left hand was 01, with the right correctly written. In copying there were no reversions.

Another case, B. W., a girl of seven, functions normal, using the left hand in writing, places the paper in the usual position and flexes the arm until the fingers point toward the body; the movement is then from left to right and strictly centrifugal, giving direct copy. What is normally the up-stroke is with her the down-stroke, and *vice versa*. The operation is extremely perplexing to an onlooker, and difficult to conceive of if not seen.

A young man of nineteen, who habitually writes with the left hand, can write back-hand only. That is, the arm movement is centripetal, but there is constant attempt at reversion in the right-to-left finger movements. He commonly reverses the numeral 8, finishing it with a horizontal movement to the left.

It is worth while to inquire carefully about the mental reaction in mirror-writing especially, and incidentally in all left-hand writing. Mirror-writing has been studied on the continent of Europe and in Britain, but scarcely at all in this country. We are indebted to certain German physicians and neurologists—Buchwald, Erlenmeyer and Peretti—and to Bianchi, an Italian physician, for accounts of many cases with learned opinions as to cause and significance. Its occurrence in connection with imbecility, dementia or paralysis led to its observation; and as might be expected from their profession, the observers have studied it in its relation to these diseases, attaching to it some pathological significance. The literature of the subject in English is extremely limited. I am aware of no translation of the works of the German writers. "Changes in hand-writing in relation to pathology"—A. Bianchi, was translated for the *Alienist and Neurologist* of October, 1883. I find no date earlier than 1879 assigned to reports of the phenomenon.

In "The Blot upon the Brain, Studies in History and Psychology," William W. Ireland, M. D., Edinburgh, 1885, are interesting papers on left-handedness and right-handedness, and on mirror-writing. In the latter article are references to the persons named above, and to a few other observers. Dr. Ireland has also published "On Mirror-writing and its Relation to Left-handedness and Cerebral Disease," in *Brain*, Vol. IV. To this I have not had access.

The Medical Record, New York, February 27, 1886, contains "Mirror-writing and Other Pathological Chirography of Nervous Origin," by Grace Peckham, M. D. The article is illustrated and gives numerous references to the investigators named. It is a careful résumé of facts and has some original conclusions, but treats at greater length of agraphia and the hand writing of cerebral and nervous disturbances.

The Germans gave the reversed copy the name *Spiegelschrift*, hence our mirror-writing. But the term levography better describes

the peculiar manuscript and is definite. The copy is of course negative with reference to our usual script, like the impression on blotting-paper; seen from the reverse side of thin paper or seen in a mirror, it assumes the left to right form of ordinary script.

A full investigation of the phenomenon involves consideration of the reason for our left-to-right script; of the whole subject of left-handedness; of brain and nerve physiology in health and disease, of the psychology of hand-writing and of the bearings of the manifestations described upon the work of education. It is the purpose of this article to call attention to this latter phase and incite observations, which will alike help to solve unsolved problems of mental physiology and to establish sound pedagogical principles.

It is very curious that a person should reverse the characters of a well-known word and then seriously consider the combination a proper representation of the idea; and still more curious that with the word before his eye he should deliberately perform the reversion and believe it a copy of the original. Of what low order must the intellection be that fails to distinguish *tac* from *cat*.

How does the subject see the word? Does the mind perceive the written word reversed and impel the hand to produce a correct copy of the mental image? Is the centre for the reception of written language sound or impaired? If there is reversion of words in the brain, is there reversion of other visual impressions? Or is the reversion of the writen word external to the subject simply? The perception of form being dull and the memory of form weak, do the motor nerves impel in the direction of least difficulty, the inert intellect meantime accepting the result? Is the perceptive process disordered, or merely the motor?

A few principles in cerebral physiology are generally accepted by authorities as follows: Most of the nerve fibres which transmit motor impulses descend from the hemisphere of the brain and decussate in the medulla, those from the left side of the brain passing to the muscles of the right side of the body, and contrarywise. Movements of limbs are thus controlled by the opposite hemisphere.

According to the theory of localization of functions definite areas of brain tissue are assigned to the various mental operations. There are in the brain, centres of smell, of vision, of heard language, of spoken language and others. The centre of written language is placed in the second frontal convolution; and of spoken language in the third frontal convolution, both being in the left hemisphere. While these definite areas of gray matter have a dominant influence in certain sensations and motions, it is not held that they singly have exclusive control of functions. If a function be impaired or lost altogether, through lesion of brain tissue, it may reappear wholly or in part; the function has been taken up, it is supposed, by the corresponding area in the opposite hemisphere.

The eminent neurologist, M. Brown-Sequard, accepts none of these theories. He holds, in brief, that special cerebral functions reside in nerve cells specially endowed which are distributed throughout the brain tissue, not in groups or definite areas. And further, that each hemisphere is complete in itself, and sufficient for all mental operations; in fact, that we have two brains.

It is to be noted that according to the theory of special areas for special functions, the centres of spoken and written language are in the same lobe; and also that there are connecting nerve fibres which join each centre with adjacent and alternate centres, thus establishing communication between centres of the same hemisphere. There are various theories as to communication between corresponding areas in the opposite hemisphere. The most gen-

erally accepted theory is that of connecting nerve fibres through the corpus callosum, direct correspondence being thus established between special areas for the same function.

And it is also to be observed that the sensory tracts are obscure. While it may be determined that a motor impulse has its origin in a definite group of cells or kind of cells, it is not determined that the sensation which precedes that impulse exists in the same group or kind of cells. It can be judged whether or not sensations are normal only after they have called forth nervous impulses which are transformed into muscular contractions.

The explanations of aphasia are in accord with the theories above stated. The centres controlling the expression of thought by language are near those which control skillful manual operations; and as most people are right-handed, the seat of spoken and written language is commonly in the left hemisphere with the seat of right-hand movements. Loss of speech, therefore, is referred to injury of cells in the third frontal convolution of the left hemisphere in right-handed subjects, and of the right hemisphere in left-handed. If there is recovery of speech the corresponding centre of the opposite hemisphere is said to have assumed the function.

In every act of writing there are two distinct mental operations: *First*, that effort of the intellect which brings into the mind the form of the letter. In early efforts this is given attention to the copy placed before the eye, that its image may be transferred to the mind; later it is simply recalling the mental image of letters already formed. *Second*, the mental effort which impels and guides the muscles in the production of characters. In the child and the person of feeble intellect, each process will be slow and laborious; in the skilled penman they will be so rapid as to seem instantaneous and merged into one. There are, however, always two distinct phases of the mind. The impression of the motions for the formation of characters follows the impression of the image of the characters in every act of writing.[1]

In the ordinary act of writing, the muscles used are those of the right side which move the hand from left to right. In writing with the left hand, then, the exercise of corresponding muscles of the left side will require movement from right to left, and there will result the levographic copy. There is necessary in the mind not only the image of the characters to be formed but also the impression of the muscular motions involved in the production of the characters; in an attempt to write with the left hand the muscles of the left side which are brought into play will naturally move the hand to the left. In the usual exercise of mental faculties, however, the image is the dominant factor and the muscles will be impelled to a reproduction of the normal image, even in opposition to the muscular tendency. The right-handed person will find difficulty in grasping the pen and executing the movements of writing with the left hand. But let some freedom of movement be gained; then to reverse each letter and move the hand from right to left is not a difficult task. The reason is to be sought in the physiology of nerves and muscles. The natural direction for forceful and often repeated movements of the limbs is away from the nerve centres, as in throwing, kicking, planing, sawing, sewing and writing. Whenever we exert muscular energy to the best effect, and whenever the exertion must be long continued, the movement will be in a direction centrifugal to

[1] Dr. Bianchi, quoted by Ireland, "Blot on the Brain," p. 306.

the body.[1] This principle may account for our left-to-right written language, though to assert so much would be to assert a different physiological principle or psychological development for Mongols and Arabs.

Ireland says: "We have only to suppose that in mirror-writing with the left hand, the writer obeyed the acquired tendency to a given muscular adjustment." He is not willing, however, to allow this for all cases, and adds: "But in some of our instances children unconsciously produce mirror-writing as a correct copy of ordinary writing, from which it may be concluded that the image in their minds from which they wrote was also inverted." He then goes on to ask if the "image or impression or change in the brain tissue from which the image is formed in the mind" is also reversed, and suggests that the images in the two hemispheres lie in reversed order to each other.

Bianchi as quoted by Ireland believes that in hemiphlegia of the right side the reversed writing will result, "because of the preserved remembrance of the muscular combination associated with the image of the word."

Whether these authorities hold that in all cases of levographic writing there is brain lesion in the left hemisphere, thus compelling the use of the left hand, is not clear. Certainly they do not refer cases of levographic writing to the muscular tendency simply, or to a perverted sense impression.

Dr. Peckham attempts to distinguish between "cerebral mirror-writing and mirror-writing from mechanical causes alone." She cites no case which has come under her own observation, but concludes an examination of twenty-five cases reported by others, by referring all to mechanical causes. "The person writing with the left hand could do so more easily in a centrifugal than a centripetal direction, the former association of ideas and muscular action making this so." She admits the possibility of cases "where there is a true reversal of the impression of the hand-writing due to the false perception of the psychical centres," and proposes as a test for such cases the ability to read mirror-writing. The suggestion seems to be founded upon the remark of Ireland about an imbecile girl, "that she can write from right to left with about as much ease as from left to right, but cannot now read it so well." She could evidently read both and write both. Would anyone suppose that there was now false perception, and now true? Or that when she wrote reversed hand the image in the brain was reversed, and the contrary when she wrote direct?

Dr. Ireland gravely remarks that among imbecile children frequent inversions occur in learning to read; they call *no on* and *was saw*. But every primary teacher knows that these are mistakes of common occurrence and liable to be made by all children. Nor is it necessary to suppose a graver defect than a weak sense impression, which miscarries somewhere in the motor tract. It would be to the point to observe if such mistakes are more frequently made by left-handed children.

Levographic copy would be read with difficulty at first by one unaccustomed to it; but it is inconceivable that one who should write it, from whatever cause, could not also comprehend it. Teachers and others have been greatly puzzled by the appearance of such writing and were unable to read it until the trick of it was acquired, when it presented no greater difficulty than any cipher

[1] "Blot upon the Brain," p. 303. "The Intra-Cerebral Tract," M. Allen Starr, M. D., in *Medical Record*, Feb. 13, 1886.

would. The photographer readily detects faults in his negative, and the type-setter reads the copy in his stick or form easily enough.

We have in the correlation of mental image and muscular movement and in the law of centrifugal action a sufficient explanation for many reversions in writing. Instances of reversion of single letters or numerals by children are common; the 3 gets the form of a script E, the 5, the 8 and the capital S are turned about. The cause is purely physiological; weak memory of form in the child affords a sufficient explanation for such errors. In experiments which I have made, seventy-five children just learning to write were requested to take the pencil in the left hand; they then copied a few words from the board and wrote their own names. Only two wrote to the left, one of these both name and copy, the other, name only. This last one could not copy with the left hand. The two mentioned are, however, awkward in the use of their hands. Both read simple sentences in the levographic script without hesitation. Ireland cites experiments with young school children in left-hand writing. The results were various. Nearly all the left-handed children wrote from right to left, and no others did so. It seems to be a fact that learning to write presents considerable difficulty to the left-handed more than to the right-handed. Young children, the feeble-minded and unlettered persons are most apt to fall into the levographic writing. Persons attacked with right hemiphlegia sometimes do so upon recovery in learning to use the left hand.

The cases which I have seen and reported above are believed to be typical cases of left-handed writing in children, and representative of all causes except hemiphlegia, hypnotism and known injury to the brain. They also present a gradation of symptoms. In the girl B. W. the correct idea of writing is maintained and the muscular movement conforms to the image in the mind, although accomplished at great pains, it would seem, to a normal writer. In the case of the boy M. M. no claim of brain lesion would likely be made. His letters and words, as they flow from the pen, are vertically inverted; and such inversion is quite as perplexing as lateral inversion. It cannot be doubted that the boy cognizes what he sets down as proper representation of ideas; the eye and hand coordinate; the clear image in his mind determines that the characters must stand in left-to-right order and to preserve this idea the sense of vision accommodates itself to the muscles, which take such position as to accomplish the result with least difficulty. In both these cases the sense impression of correct copy dominates in the act of writing; had sense impressions been feebler the muscular sense might have determined the form of copy and levography resulted. Passing on to a consideration of the children who used the mirror-writing altogether in their early efforts, there seems no strong line of demarkation separating them from the others. M. M. after two years in school still reverses some characters. We are not warranted in holding that in P. R. and N. M. there is reversion of sense impressions on account of the reversed copy. It is not proven that all who use the reversed copy somewhat persistently are feeble-minded. Dr. Ireland instances a boy who wrote that form secretly. He was described as "a thin, pale boy of thirteen, who used his left hand out of school, rather intelligent, and getting on well with his lessons."

In both P. R. and N. M. there are perverted ideas besides the ideas of written language. Inherited tendencies, or malnutrition of gray matter may explain them all. There is inherited ignorance through a long line of ancestors. There are no books in the home

except the few school-books of the children. There is the constant grind of hard labor for the sole purpose of accumulation of property. Intellectual pursuits find no place. Is it surprising that the feeble body should have a feeble brain; that debility of the system should be most marked in the cerebral and nervous regions; that feeble action of mental faculties should result from scanty nutrition of those regions?

The evidence of numerous examinations in known cases of diseased brains point to injury of brain tissue as the cause of aphasia in N. M. He recovers slowly from the injury. Loss of the use of oral language is often accompanied by partial or total loss of the power to write. And naturally, since destruction or impairment of the speaking centre may readily involve, through the connecting nerve fibres, the writing centre also, in varying degrees. Cases of uncomplicated agraphia are rare, and this fact is important in our consideration of mirror-writing. Impairment of one function through injury of its centre may amount to complete obliteration without impairment of any other function, especially in adults. Impairment of the speech centre would likely be more far-reaching in its effects than of the writing centre. When we write we try to think "how it will sound." The impression of written language seeks re-enforcement and confirmation from the impression of spoken language; but the impression of spoken language, in general, needs no such confirmation from the writing centre. Moreover, the power to write is of later development than the power to speak, involves more complex physical apparatus, and disturbance of the function is less likely to be dependent upon structural changes, and more likely upon physiological ones. It would seem from this that the reversion of written language is not always an indication of brain disease. There are varieties of aphasia, and there are irregularities of speech amounting many times to grave defects which need not be referred to brain lesions. Such are the inversions of words by children in reading, and the more serious substitutions or forgetfulness of terms. Such perverted mental products stand in a descending series from perfect speech through casual slips of the tongue, substitution of one name for another, total forgetfulness of certain terms, the incoherent mouthings of inebriety to complete aphasia. So in written language we descend from the regular forms of the expert penman through the hurried hand of the busy man, the irregular writing of the illiterate, the careless writing of the child, the labored attempts of the left-handed child, the occasional reversion of a 3 or a 5, the complete reversion of levography, to total agraphia. Manifestations in the former series have been pretty carefully studied and each form referred to some appropriate cause more or less dependent upon material conditions; the latter series has received little attention, and the phenomena of hand writing offer a wide and interesting field for psychic investigation.

A. Geissler and R. Uhlitzsch in Heft, 1 and 2, Vol. XXXIV. of the Zeitschrift des Königlich-sächsischen statistischen Bureaus, make a valuable contribution to the anthropology of school children, in four sections as follows:

Section 1, which is general, treats of previous anthropological investigations, noticing the labors of Quetelet (in Belgium), Bowditch (in Boston), Roberts (in England), Pagliani (in Italy), Erisman (in Russia), Koller and Spiess (in Germany). The investigations of Geissler and Uhlitzsch were undertaken in accordance with an order of Schulrat Lohse of Freiberg, who, in 1886 determined upon having the school-children in his district

measured. The measurements (taken, wherever possible, without shoes, and with proper attention to the arrangement of the hair in the case of girls) were made in the following December. The measurement cards contained place, class, name, birthday, year of birth, and height in centimeters.

Section 2 treats of the material obtained and the results. In all 21,173 children were measured, of whom 10,343 were boys and 10,830 girls. The ages of the children extended from 6 1-2 years to over 14, half of them being contained in the series between 6 1-2 and 7 years and over 14. The differences in stature are remarkable:
The range was from 38 cm. (6 1-2 to 7 yrs.) to 79 cm. (over 14).
For boys and from 35 cm. (6 1-2 to 7 yrs.) to 65 cm. (13 to 14).
The smallest boy (7 yrs.) measured 88 cm.
The two smallest girls (7 to 8 yrs.) measured 85 cm.
The tallest boy (over 14) measured 176 cm.
The tallest girl (over 14) measured 167 cm.

These cases, of course, are quite exceptional. The greatest number of the boys are to be found between numbers which have a variation of from 8 to 11 cm., and the girls, where the variation is from 7 to 13 cm.

Section 3 is devoted to the consideration of the average, which is obtained by use of Gauss' law of errors.

Section 4 consists of comparisons with the results obtained by other observers, and tables containing the results of Quetelet, Bowditch and Erisman are given.

The principal results of the investigations of Geissler and Uhlitzsch may be stated as follows:

1. The children of the Freiberg school are shorter than in the rest of Saxony. 2. Up to the 11th years the boys are taller than the girls, then they are exceeded by the latter until the 16th year, when the boys again become taller. But it would appear that at the age 12-13 years both sexes are about the same (averaging 135.5 cm.). These results are in general accord with those of Bowditch and Erisman. 3. The miners' children are on an average shorter, and the children of the Bürgerschulen taller than the generality of the school children. 4. The arithmetical averages do not adapt themselves for use in anthropological investigations.

LITERATURE.

I.—MORAL EDUCATION.

Die Charakterfehler des Kindes, Eine Erzieuhngslehre für Haus und Schule. Dr. Fr. Scholz, Direktor d. Kranken und Irrenanstalt zu Bremen. Mayer, Leipzig, pp. 226.

After noting the hereditary and acquired elements in character, the author emphasizes the necessity of thorough diagnosis of abnormal characteristics and tendencies as preliminary to rational educational treatment. He would look for signs of mental health or ill-health in the child's apperceptive ability, attention, memory, and appetite for learning; in the presence or absence of sustained rational motives in its actions; in the presence or absence of a normal instinct for play; in the child's emotional tone, egoistic and altruistic feeling and in elementary æsthetic feeling as regards order, cleanliness and the like. After mentioning several possible classifications of children's faults (as natural and artificial, acute and chronic, mental and physical in basis), the author assumes a classification according to the usual three-fold division of mental phenomena—intellect, sensibility and will. He states that this classification is assumed because it is convenient, and warns against the notion that the three classes of phenomena are isolated from one another. Following this introduction the author gives up most of his book (pp. 35-150) to a series of thirty-four brief characterizations of abnormal types, as follows: In the field of emotion are pictured five types (the melancholy, sensitive, freakish, fearful and embarrassed), alike in weakened egoistic feeling and depressed tone; four types (the haughty and arrogant, obstinate, proud, and forward), alike in heightened egoistic feeling and exalted tone; and three types (those whose feelings are blunted, those who apparently at times seek pain, and those taking pleasure in the suffering of others), exhibiting emotional deformity. In the field of intellect are characterized three types (the stupid, the mind-wandering, the lazy) showing weakness or inhibition of the mental processes; and four types (the precocious, the phantasy-loving or the phantasy-less, the inquisitive and secretive, and the disorderly, uncleanly and pedantic) showing undue acceleration of mental activity or overgrowth in certain directions. In the field of volition, are represented three types (the restless, awkward and silly) marked by lack of sustained rational motive in action; five types (the covetous, those who have a mania for collecting, the deceitful and thievish, the disobliging and the envious) characterized by undue egoism; and five types (the malicious, cruel, vulgar, those who take pleasure in destroying, and the lying) exhibiting antisympathetic feeling in an extreme degree. It should be observed that often several varieties are given under a single type, while in other cases, the alleged types vary only slightly. The names of the types are to be understood only in connection with the text. They are to be taken as clues and not as adequate designations.

The closing chapters treat of Child suicide; Influence of mind and body upon each other; Education of mind through the body, (namely, through sense organs, muscular system and vaso-motor system, control of the latter being equivalent to self-mastery); The means of education (through making the environment such that the child's adaptation to it will be beneficial, through eliciting good habits, through instruction and exhortation, through prohibitions, rewards and punishments), and The qualities of the educator. The best thing in this book is its series of characterizations of child types. For while there is necessarily much that is arbitrary in such type-making, the parents and teachers for whom the book is written have pointed out to them a great variety of important things to look for in child life, together with a view of the relations of many well-known child-faults to the development of character and instructive suggestions for treating such faults.

W. L. BRYAN.

Ueber sittliche Dispositionen. Von DR. ANTON OELZELT-NEWIN. Graz, 1892.

Man is not born good or bad; the child at first has only feelings and emotions like those of the higher animals,—fear, anger, then love and sympathy, later shame and pride. The tendency to these six elementary feelings is innate. The degree of the several tendencies determines with necessity the direction of moral development. Accordingly, we are not born with a definite moral character, but with the elements of a definite moral character. From the corporeal phenomena which accompany these several feelings, from observations of animals, children, and insane, especially morally insane, and from the alleged obstancy of emotional tendencies to educational influence, the author argues that the existence and degree of tendency to each of the six feelings held to be elementary, is instinctive and that the sum of these tendencies determines the moral character. Statistical methods of studying the problem of heredity, such for example as that employed by Galton, are held to be worthless except in connection with such special observation and analysis as that which this book presents. In conclusion, it is urged that the special form of determinism which the book advocates is not dangerous to morals, certainly not more so than a theological or other theory of determinism.

W. L. BRYAN.

The Moral Instruction of Children. By FELIX ADLER. Appleton & Co., 1892. pp. 270.

Three schemes have been devised: I. Let all sects meet and eliminate differences and agree to teach the rest, which would be so fundamental that no one would be offended. This, however, would emasculate religion, which should be sectarian for children. II. The German method allows each sect to give instruction to those of its own creed. The sects appoint, but the state examines the teachers. In American state schools this is not desirable. III. Each sect may build its own schools and draw on the public fund according to its number of children. This plan would not conduce to national unity. The best way is to cut loose from the religious basis in schools and impart a common fund of moral truth. We must not assume that what is not for morality is against it. Æsthetics teaches ethics, so does cleanliness. A basal postulate is a good home. Science teaches truth; history inspires by noble example; literature voices hopes and sentiments; manual training, music, gymnastics, the discipline of the school, and the personality of the teacher—all

should teach morals. Schools should not teach the philosophy of ethics, or ultimate motives of duty. Moral training should impart the duties fit for each period of development at the fit time, and at each period there should be one predominant duty, about which all others should be grouped. Each stage of life has new ethical interests. Regularity, obedience, conscience and choice, reverence, are the proper order. The first mode of intellectual moral training is *fairy tales*, to bring in the imagination and to awaken the sympathies, and to idealize life. The Märchen represent the childhood of the race. They teach love of the under-earth, of flowers, animals, and the sky. They must be told, not read, and without a moral. The immoral elements must be eliminated. Many tales are given. Next come *fables*. These are Asiatic in origin, and represent a state of things where rulers were tyrants, and must be still more carefully sifted, but can be made to teach many virtues and especially to warn against many vices. Each usually deals with one moral quality only. Third should come *Bible stories*. These, too, have stood the supreme test of time. Many of these are told very freely indeed, and in the light of liberal criticism. Fourth, the Odyssey and Iliad. The grammar school should have lessons in special duties, as, e. g., the duty of acquiring knowledge, duties relating to physical life, duties relating to feelings, to others, ending with civic duty. Maxims and proverbs should be freely used. A more advanced book is promised.

Why is not due credit given to Ziller and Rein for originating many of these ideas?

La première annee d'Instruction Morale et Civiqe. Par P. Laloi, Paris, pp. 179.

This is to inculcate ideas of right and of political economy as required by the law of March 18, 1882. It treats of family, school, apprenticeship, duties to self, others, society, trades, workmen and capital, farmers, office-holders, the state, administration, and the duties of citizens. On each page is the ethical text, well broken by paragraphs and capatalized words. Below this in fine type a summary of the law covering each point, and below recitations, stories, etc., to illustrate each duty. The chapters end with résumés and questions. The copy here in hand is from the 23d edition in 1890. A supplement fully describes a few score terms, and defines more briefly a few hundred.

Ethics: Stories for Home and School, written and compiled by Mrs. Julia M. Dewey, Chicago (no date), pp. 197.

The author has written a book on "How to Teach Manners." This is intended for advanced primary and for two or three higher grades. Sometimes instead of a story or poem a direct homily is used. It is designed to supplement the teacher's instruction in ethics. Most of the 100 tales are very light. Tom is dirty and is said to be sick and turning black and sent from the table to wash; Bert let his room get littered and promised to keep it more tidy; Davy lost a sleigh-ride by getting up too late. Amy found that bees, squirrels and wasps had something to do and so concluded to help her mother; the boy who always cried wolf was not heeded when wolves came, and his flock was killed. The morals inculcated are minors and often sentimental.

Ethics for Young People. By C. C. Everett, Professor in Harvard University. Ginn & Co., 1891, pp. 185.

Ethics is the science of ends desirable in themselves. It is a way of life. The ethics of custom was first. This is very imperfect,

uncertain, variable and does not belong to the man who practises it. As life grows, complex customs conflict, and different people have different customs. When the ethics of custom was slowly breaking up, epicureans based morals as happiness. This makes selfish and short-sighted. The stoics taught repose and self-command, and their views are still noble inspirations of courage, right, pride and strong will. Each child is advised to keep a "book of heroes," and put down all very noble deeds and men heard of. Discontent arises from the wrong conviction that arrangements of outer things can make us happy. Education is a duty that we may get the advantage of all the generations who have gone before. The book proceeds to obedience, good temper, the play-ground, friendship, the home, patriotism, reading, inverting temptation, the conscience, etc. There is no obvious plan in the order of topics, and it is addressed to quite young children.

Practical Ethics. By Wm. DeWitt Hyde, D. D., president of Bowdoin College. Holt, N. Y., pp. 208, 1892.

This admirable little hand-book has a novel plan. Twenty-three duties are considered, each under the following eight heads, viz., object, duty, virtue, reward, temptation, vice of defect, vice of excess, penalty. This scheme, although generally admirable, in some cases seems somewhat artificial, e. g., realization of self has pleasure as its temptation, unscrupulousness as the defect, formalism as its excess, and corruption as its penalty. The preface is chiefly devoted to a few paragraphs on sex, which seem an afterthought, as they appear in the scheme, but not in the book. There is no discussion of the nature of obligation or of ethical theories. The treatment is clear and direct, with few quotations or illustrations, and especially adapted to collegians. Religion is wisely presented as the consummation rather than the foundation of ethics; and the last chapter on religion could offend sensible members of no religious communion.

The Virtues and Their Reasons; Ethics for Schools. By A. Bierbower. Sherwood & Co., Chicage, pp. 294.

This book consists of brief homilies on between one and two hundred virtues and vices, beginning with love, benevolence. Under antagonistic vices and hate are discussed practical joking, hazing, cruelty to animals; under truth come bigotry, hypocrisy, bribery; under gambling come raffling, parlor-games, betting and speculation, and blackmail; under special duties come taxes, jury and military duty, public education, voting and election frauds and intimidations, rioting; under self-development comes physical training; under temperance, tobacco prohibition and opium are discussed, while profanity and slang come under vices antagonistic to self-respect. The chapter on purity and love is brief but plain. The tone of the whole, while good, is hardly above commonplace, and is very far removed from the terse, pithy proverbial style of ethical inculcation sanctioned by an antiquity so venerable. The absurd proportion which the teaching of temperance and anti-cruelty to animals has assumed in so many schools is reduced to its proper proportions.

Manuel d'Education Morale. A. Sicard, Paris, pp. 288.

This hand-book of moral and civil instruction begins with the relations of man to animals, and passes to the soul and God, the existence of both of which are proved. The soul is spiritual and immortal, and God is perfect and one, powerful, holy. All is interspersed with

quotations from the Bible, poets and others, e. g., "piety is all of man," "prayer is the respiration of the soul, without which it dies." It is an "interview" with God, and is a duty and a joy. A brief section on Jesus Christ and immortality concludes this section. Then come sections on the family, duty of education, duties to parents and others. The school, its duties and benefits, duties to self, to society and to the country. On page 225 begins the civic part. This describes the political organization of France and its administration from the Commune up; the administration of justice. A section each is given to the Catholic, Protestant and Jewish religions, finance, army and navy, post-office, public works and institutions, wills, contracts, police laws, duties of economy and providence. On the whole this is the most concise, judicious and comprehensive of these French manuals we have seen, though less interesting and less special than that of Lavisse, Ped. Sem. II. p. 147.

The Ethical Problem. DR. P. CARUS. Three lectures. Chicago, 1890.

Some religious or philosophical view is an indispensable basis of ethics, and that view should be monistic. This is the chief thesis, and is held against the society for ethical culture, which is like the salt of the earth, in danger of losing its savor. Sidgwick says the moral ought is an ultimate unanalyzable fact. Madame Royer says good is the sum of pleasurable feelings in all conscious beings, and bad is the sum of their sufferings. Clifford says its end is increased efficiency. But ethics, says Carus, is not an example in arithmetic (Royer), to calculate how we can purchase the greatest happiness with the least pain. All, it is said, which increases the sum of conscious existence is good, and all that diminishes it is bad. Consciousness is cursed by pain. Spencer's perfect adaptation, says Royer, would be a dream-like idyllic mechanism. Thus good is cursed by want. Gizycke's maxim is, "Strive for peace of soul by devoting thyself to the welfare of humanity." Feelings, he says, are the ultimate basis of morals. Mill says it is better to be a dissatisfied man than a satisfied pig or fool. Höffding's word is *welfare.* Action is more than knowledge, and to preach morals is easier than to put it on a philosophical basis. A purely ethical religion would purify religion. But religion is a conception of the world applied to practical life. Religions are now in their infancy. They will develop into scientific maturity. Only the philosophy of facts is basal and will remain. Mathematics and logic were once thought to be abstract and to hang in mid-air. Ideals are born of want and are of lowly origin. Man alone is ethical because he only can think. Before I act, I think. Metaphysics is only the formal laws of physical science, as logic is of thought. Otherwise the ethical being would be a misogynist, hate reason and wish to be wound up like an automaton. Indeed all knowledge can be formulated as an ethical precept. To exist we must obey reason. The maxims of our conduct must become a universal law. Ethics must expound our individual interests till they take in the race, and act as if we were immortal and living in all time. Soul-life is a continuum. Man's greatness lies in the wide relationship which his brain makes possible. Freedom is to will as you wish. Moral worth depends on the amount, scope and weight of duty he is able to carry. This is the kingdom of heaven, into which the rich so hardly enter. To satisfy all our desires places us, like Faust, in the hands of Satan. Pessimism teaches that a life for pleasure alone is not worth living. We should be stewards of the soul-life of mankind. This "meliorism" will purify religions by regenerating them out of ethics. The larger and stronger man's ideals the greater and more valuable his life.

Labor the Divine Command. TOLSTOI. 1890, pp. 100.

This is at root the work of the peasant Bondareff, who inspired Tolstoi's social theories. The two laws of humanity are manual labor for men and motherhood for women. Tilling the earth is the highest labor. Wealth is bad, for it frees men from the natural law of work. Every man must support himself and family by hand-labor, and every woman must nourish and educate her own children. To violate these laws will annihilate humanity. Men would become but bundles of enjoying nerves, and machinery will do all work. Adam's forbidden fruit was taking the fruits of others' labors. Labor is not a curse, as man's sloth and avarice have called it, but a joy and a blessing. It increases the energy and health of the mind. We must abandon cities, impure Babylons, where men are more consumers than producers. Ten honest, strong men could solve the problems of society, and of capital and labor without conflict, if they would set out wisely and slowly to show the world what could be done. Bondareff thinks 40 days' work per year would earn a man's bread. He writes at the age of 60 in a mystic biblical style like J. Boehme. His will directs that he be buried in rich soil, with no mound to mark his grave.

Tolstoi's Gospel Stories are brief tracts for the people, teaching in simple tales the powers of the Christian precepts, which are prefixed to each tale. They are simple, vivid, dramatic, and have had a wide circulation as text booklets of morals.

Life. By TOLSTOI. Pp. 295.

Morals is to think well. Life is the sum total of the functions which resist death. Reason, logos, is the birth of the true life in man. It sprouts from the animal as a seed, and is above personality. The end of learning should be to study this law of reason, to which man must submit. This is the new birth of the spirit, the awakened consciousness, the renunciation of the lower. This moral act brings unity into the world, makes men love even animals, and brings the higher love, and makes us abandon lower happiness. Its essence is sacrifice. A madman imagined he was made of glass. He fell down, said "smash," and died. We must live above death.

Methods of Teaching Patriotism in the Public Schools. By Col. G. T. Balch, N. Y., 1890; pp. 109.

Badges of citizenship for both pupils and teachers, flags concerning which copious details are given of scholars' flag, class flag, the school flag, and signal flag; these are the chief means. The author's love for his country's ensign is that of an old soldier's, and is touching and almost sublime. He gives the history of the flag, and of the flag on school-houses, state flag-house, dimensions and proper cost of flags and staffs, how to dedicate and inspect and preserve flags; flags as semaphore and other signals; forms for presentation and dedication; election of standard bearers, salutation of the flag, etc. The end of all is to cultivate emotional and logical patriotism. A little flag stands on the desk of the pupil who shows token of becoming the best citizen. The ceremonials must be military. The signal flag should never be displayed till every pupil is in favor of loyalty to American principles. This is teaching without books.

In Darkest England and the Way Out. By GENERAL BOOTH, 1890, pp. 285.

This very interesting and remarkable work in what may be called volks-pedagogy begins with a description of the state of the poorest

and most depraved classes in London, and concludes by describing city, farm and over-sea colonies as the three remedies. The first comprises food-depots and shelters at the cheapest possible cost prices, and a workshop or labor yard, employment bureaus, and household salvage brigades. The rag and bone picking and the garbage and food leavings work should be better organized. The same is suggested for the collectors of old bottles, boots and shoes, rags, umbrella mending, scissors and knife grinding, old tin collecting and waste utilizers generally, which households should be taught to co-operate in the disposal of. The farm colony should be on a tract of 500 acres or so near London suitable for market gradening, and an industrial village should be gradually developed. To the over-sea colonies a salvation ship should run. Each of these should be prescribed for individuals according to their liking and aptitude. The slum sisters should aid in selection; a trundling hospital on wheels; a prison-gate brigade to aid just discharged criminals; homes for drunkards; farm homes for lost women; an inquiry office for lost people; asylums for moral lunatics; poor men's and lawyers' banks; a matrimonial bureau; self-denial week, knee drills and a seaside white chapel, are other reformatory agencies described in detail.

Stories of the Saints. By Mrs. C. Van D. Chenoweth, Boston, 1891.

The Bolandist Fathers have for centuries, as is well known, been devoted to writing the lives of saints, thousands in number, and their ponderous Latin tomes, the product of hundreds of years of well-sustained toil, are among the noblest monuments of piety and learning. Butler, and scores of others less known, have edited and adopted these. Several approved Catholic volumes tell the story of one saint for each day of the year. This author's task is modest. She selects eight saints and tells their virtues in admirable style and type for Protestant children, feeling that they should not be longer deprived of the moral stimulus to be derived by drawing upon the great reservoir of Catholic hagiology.

Great Lives. A Course of History in Biographies. By I. J. Mombert, D. D. First series. Boston and New York, pp. 324.

This is a collection of 32 lives, about equally divided between Greek, Roman, mediæval and modern history. Justinian, Mohammed, Boniface, Charlemagne, Alfred the Great, Godfrey of Bouillon and Columbus are the mediæval group; while Washington, Franklin, Lincoln and Grant in the modern group give the book an American flavor. All is dry, prosy and chronicle-like.

A Book of Golden Deeds, of all Times and Lands. Gathered and Narrated by Charlotte M. Yonge. London, 1892, pp. 454.

The author of the Heir of Redclyffe has here brought together 50 tales, mostly from modern sources, and largely from literature rather than history, and from common life rather than from the acts of great personages. It need not be said that the stories are well told, although their merit is very unequal.

Ethics, Stories for Home and School. By Mrs. Julia M. Dewey. Boston, 1891, pp. 197.

The author of "How to Teach Manners" has here brought together 86 tales or incidents in prose and poetry, designed to supplement reading for children of advanced primary grades.

A Song of Life. By Margaret W. Morley. Chicago, 1891, pp. 155.

This prose song is of flowers, fishes, frogs, birds and man. The deep reason why we love flowers is not so much that they breathe

and eat, but also reproduce. The pistil or mother part of the flower cherishes the ovules. The pollen from the stamen or father part falls against the sticky stigma and works a wondrous change among the molecules of the ovule, as when a divine spirit moves upon the void and formless egg of chaos. When spring wakes the new life, the egg producing cavities stir with a new force. Nature thrills with vitality. The joy of existence fills swamps and groves with the flood of vitality, which sweeps through them after the long icy winter, and all for the sake of new life in another generation. This is love, and it starts the strong formative *idea* that develops like out of like. "Oh, the egg! the wonderful egg! egg! the egg!" Who shall explain the mystery why and how each cell takes its place and form in each organ of the body, as if the stones, wood, glass, etc., of a house came together of themselves and then grew in due proportion? This book is uniquely gotten up, and teaches the lesson of sex with rare delicacy.

II.—RELIGIOUS EDUCATION.

Leaders of Christian and Anti-Christian Thought. E. RENAN, London, 1892.

There was a glorious moment when Fichte, Kant, Klopstock and Herder were Christians, but Protestantism can never attain a fixed state. Unitarianism and its growing Channing-cult in America illustrate this. Culture without poetry, religion without mystery, nationalism without criticism is an aspiration peculiarly American. Channing was but very little of a scholar or student. He dabbled a little in the miserable Anglo-Scotch philosophy. He was a respectable, well-bred and dressed, sedate American saint, his theology of a rough practical Franklin pattern. He was a naturalist, yet admitted miracles, prophecy and revelation. He submitted to the Bible, but not to the more obvious authority of the church. But is habitual Bible reading good when some of its parts so muddle simple minds? He counted how many times hell was mentioned in the Scripture, and postulated on faith made up of the common residuum of all faiths. Channing's mission was moral, not intellectual. His world lacked science or genius, but had goodness. It was therefore too simple.

To *Feuerbach* (as to Hegel) the Christ-legend was on a plane with that of Pythagoras. It was vulgar realism, but not poetic. To Feuerbach Christianity is a perversion of humanity in its deepest instincts. It is the prison of Circe. It preys upon his nerves. Jesus on the cross is ugly, Prometheus chained to his rock is beautiful. Christian meditation exercises its piety more upon the infant Christ, the virgin, the crucifixion, than upon the trinity. It turns out nature, which the Greeks loved. Feuerbach had the pedantry of audacity to say that by his book he had undone himself with the world and God, but they would both have forgiven him had he wished. No German can be irreligious. If he thinks himself atheistic it is with unction.

Next to Jesus, *Francis of Assisi* had most absolute ingenuousness, the deepest sense of filial relation to the Father. His life was a perpetual intoxication of divine love. He was a prodigy of holiness, gentleness and simplicity, a genius of devotion. He lived in ecstasy for days on the chirp of a grasshopper, on the song of a bird, yet he was a remarkable originator and organizer. All things living or inanimate are spoken of as his brother, sister, mother, father. He undertook to carry out the Galilean programme and *be a Christian*. He wed poverty. His followers sometimes made holiness a carnival.

Joachim de Flor was probably the author of *The Eternal Gospel*, which described a third religious state down to about 1260, and to succeed the gospel as the definite law of humanity. The book is now lost in the original form, but the doctrines are reconstructed, and were embodied in the spirit of Assisi and the Franciscans. The Old Testament was the reign of the Father, the New that of the Son, and the *Eternal Gospel* described the third dispensation of the Holy Spirit, the reign of the meek. Popes knew the literal sense, but to know the true inner spiritual sense was to be given to a single order of monks. Spiritual men will thus be freed from Rome. The Old and New Testaments will both be abrogated. This was an abortive attempt to create a new religion. With a little more ardor and fanaticism the world, then Christian, would have become Franciscan. This is the most daring attempt at religious creation to be found in modern times. The church, the University of Paris, the Dominicans and the civil power united to suppress the doctrine, or it might have changed the face of the world. Happily history is more and more controlled not by imagination, enthusiasm, illuminati, but by good common sense, and by its disciplined and reflective forces.

The Idea of God as Affected by Modern Knowledge. By JOHN FISKE, 1885, pp. 171.

The infinite energy from which all comes wells up in man as consciousness. Can we know it better than simple Margaret understood Faust's definition of God? Are our efforts to do so like peeping behind a mirror, and can we pray to X°? This great idea is overlaid by rites and doctrines once vital, now dead. It is the burning bush of Moses, natura naturans of Spinoza, and its prayer might well be, "Save me from my friends." The idea of God originated in dependence upon something without us. The Jews touch the sublime heights of monotheism first, and Jesus and Paul universalized the national deity Jehovah. Only individual thinkers like Kleanthes had before touched this idea. There is no distinction between what man discovers and what God reveals. The trinity reconciled the philosophic schools which had divided the orient world. The Father is the abyss of being, the Son is the immanent reason of Plato, Aristotle and the stoics, and the spirit is ethical, conscious and anti-pantheistic. The Greek immanence did not please the Latins. It was Augustine who transcendentalized the immanent God of Clement and made man seem remote and thus originated the false struggle between science and religion. The simile of Paley's watch is replaced by that of the Flower. We crave a final cause, and would God put us to permanent mental confusion? All matter quivers with energy, and a tremor in one part is felt throughout all. Force or a one animating power is the one reality. It is not matter (=not-self) nor blind necessity, but psychical. We can know it only in terms of human knowledge.

The Genesis of Genesis. By B. W. BACON. Hartford, 1892, pp. 352.

The higher criticism admits Bibles within the Bible. All schools of documentary analysis practically now agree. Semitic literature is coming to claim a place in every course of liberal education. The development of the religious consciousness of Greeks and Hebrews must no longer be left to pulpits and Sunday schools. The Old Testament is studied as never before. Evidence varies from the most delicate ballancing to the highest probability. Genesis is not an hodge-podge, but has unity and a clear plan. Criticism is appreciation. Higher criticism is necessary, and reproduces the circumstances out of which the books arose, and thus

shows them to be the true children of their time. So refined is it that the old document, "The Teaching of the Twelve Apostles," had inferred its existence before. Ancient documents are generally conglomerate till canonization stereotypes them. Before this books were brought up to date by adding what was known. Fragments are not digested, but previous sources are killed. After more than a century and hundreds of workers, all men and sects agree. No professor of Hebrew denies four documents in the Pentateuch. From the first idyllic folk-lore moral prophetic stage to the Deuteronomic code, we have a progressive revelation of the Hebrew religious consciousness, of which evolutions the Bible is the ripest fruit. The Jehovistic precedes the Elohistic original by perhaps 50 years. The priestly code comes last, and is dry, barren, mechanical. In the second part Genesis is printed in six types to show the six sources. In part three each part is printed by itself.

The Destiny of Man Viewed in the Light of His Origin. JOHN FISKE.

In dealing with the unknown we should take a start far within the known. In Dante, earth and man were central in the universe. We abhor atheism because it denies the psychic in the universe, and makes man less central. The gaseous turmoil of other suns warms other earths, but God speaks in the still small voice of the soul. Darwin has shown that the creation and perfection of man is the goal to which nature has all along been tending. This gives a significance to life that no poet or prophet has dreamed. Silently came that great moment when psychical changes came to be more important than physical. The brain grew. Now the life of the soul came to be more important than the body. Zoölogical change had come to an end. Not species but culture is now the end of nature and there will be no higher creature than man, the production of whose soul all nature has governed and tended. Man controls more and more physical and selective processes. Ante-natal experience cannot organize the complex habits now needed, and individual experience must supplement heredity. Thus infancy originates till it covers one-third of human life-time, and with it education and increase of brain surface and capacity of progress. As all science is increased eye power, so all art is increased hand power, and all social and political organizations and institutions are enlargements of the family. Infancy made the family, sympathy, and ethical feelings. Man grows in mind faster than in morals, because he always advances by struggle and fight, especially so long as food-supply is limited. In tropical islands, with rich food-supply, men are gentle. With pacific, industrial relations, and the abolition of robber tariffs falsely called protection, peace and moral obligation will include all mankind, and federation and arbitration will prevail. Thus and therefore Mr. Fiske cannot believe that this world is all. All rests on mystery. Soul may be a divine experience. Spirit may be nature's goal.

The Canon of the Old Testament. By T. MULLEN. Bp. of Erie, N. Y. 1892, pp. 664.

Canon means a rod, rule, standard, or on the list. Non-canonical books may be pseudepigraphical, or even apocryphal, and that, however "sapiential" they may be. The old Hebrew canon was a product of gradual growth by addition. When Esdras, "a priest and ready scribe," led back his colony to Jerusalem, 457 B. C., some ten years later, when the walls had been rebuilt, at the feast of the tabernacle for 7 days Esdras read and interpreted the word of God. Tradition says that he also collected, corrected and arranged the sacred

writings, which the Sanhedrim examined and declared closed. The apocryphal Esdras IV. says he was warned by God to rebuke the people. He answered, the law is burned and no one knows his will, and prays for inspiration to write. He is told to absent himself 40 days with many tablets and five rapid scribes. Withdrawing with them to a plain he drank a cup of fire-colored water and talked day and night till 204 or 94 books were written, the last 70 not to be revealed save to the wise men. As one record has it, Esdras, retiring from the rest, "belched forth" the salubrious Scriptures. Others say that finding the books lost he composed 22 from memory. The Talmud, or unwritten law Moses is said to have received from Sinai, ascribes the formation of the canon to Esdras. It adds that a college of 120 rabins assisted him. Probably the canon was not definitely closed, at least before Christ. There were several slightly differing canons. The Christians and the scholars of the reformation probably accepted practically the scholarship and the canon of the Jews. Esdras may have invented a new kind of letter for writing the Bible, but probably he did little else save what is stated in our Scriptures. Just who made the canon "is not known." The various codices, the ancient schismatics and the modern sects have varied much in the canon they have adopted, especially concerning the deutero-canonical books. St. Augustine said he would not believe the gospels unless the authority of the Catholic church bound him to do so. For Protestants only the spirit as internal revelation or evidence can be relied on. No criterion of canonicity has been formulated, not even by Swedenbourg, who rejected about all of the New Testament except the gospels and Revelations.

The Idea of God. DR. P. CARUS. Chicago, 1892, pp. 31.

Is this a truth or hallucination? It is the grandest thought of the ages past. The etymology of the words for deity in different languages make them to mean, being, eternal, bright, strong, master, source, etc. God is nominal and abstract, and our senses never experience him. The idea is regulative, but not the same in any two people. Henotheism (deity in single things) was first. Monotheism grows dualistic. God is a power which makes for righteousness in and out of ourselves. All the best we know we call God. A composite photograph of the God-idea would show him the ultimate authority. Entheism is the ethical life of nature, and is God. He fought against the Persians, was revealed in Shakespeare and in the Songs of David. He blooms in spring and in our better feelings, and in the curious quests of science.

Lectures on the Origin and Growth of the Conception of God as Illustrated by Anthropology and History. London, 1892, XVI. 296 pp. 8 mo. COUNT GOBLET D'ALVIELLA.

In this volume, the lectures on the Hibbert foundation for 1891, Count D'Alviella, who is professor of the history of religions at the University of Brussels, an institution "founded by private initiative on the principle of free inquiry," following, as he says, in the footsteps of Tiele and Réville, of Spencer, Tylor and Lang, attempts to "reconstruct as far as possible the first manifestations of the belief in the Divine; with a view to tracing subsequently, in the facts recorded by history, the sequel of a development which, if we may judge of the future by the past, has not yet reached its goal." The six lectures treat of the following topics: Methods of Research into the Pre-historic Manifestations of Religion; the Genesis of the Idea of God; Polydemonism and Polytheism; Dualism; Monotheism; the Future of Worship as Deduced from its Past.

The comparative method, with the aid of philology and anthropology, has overturned the idea that the ancestors of the Semites, the Aryans, the Egyptians, the Chinese, or any other known peoples started with pure morals, exalted beliefs and monotheistic religion. The new science of folk-lore points out the survivals that now exist of primitive and barbaric rites and usages in even the most civilized and Christian of modern peoples. To trace the continuity and progress in the religious evolution is the work of a true student of religion and of the eternal verities of the universe. To show the advance that has been made in these matters, an orthodox Roman Catholic writer, M. l'Abbé de Broglie, professor of apologetics at the University of Paris, is cited to the following effect: "The Judaism of the later period shows progress from the religion of Moses, and the latter from that of the Patriarchs. Christianity . . . . is an immense step in advance; and in the church itself, as the great doctors maintain, there is progress in the knowledge of truth."

He also cites a distinguished professor of the Catholic University of Louvain and M. de Pressensé, the representative of French Protestant orthodoxy, the one to the effect that "this original monotheism does not effect any of the religious transformations and vicissitudes which history can trace, and which may become the subject of our studies;" the other as saying that since humanity, in consequence of moral fall, must have lapsed into a state of absolute savagery, from that point onwards the study of savages is the best means "of reconstructing, with some degree of precision, the social and religious condition of the rude infancy of humanity, of which they are themselves survivals." Thus, though positing a false start, even orthodox church-men are beginning to see the truth of the gradual evolution of religion and of religions.

Religion Count D'Alviella defines as "the conception man forms of his relations with the superhuman and mysterious powers on which he believes himself to depend." With regard to mythology, the author takes leave of Max Müller's theory in these words: "The unwarranted extension of personality which forms the basis of mythology is due, not to a 'disease of language, but to a disease of thought,' if, indeed, one may apply such a term to an illusion which enters into the normal development of man." Following are a few of the more striking passages in the work:

"It is interesting to note that men have in every case been conscious of this parallelism established between the celestial kingdom and the states on earth; but, by a common illusion of perspective, it is always the human society which has been supposed to be modelled on that of the gods." (P. 152.)

"The only possible explanation (of the 'absurdity and the crudity which make the more cultivated nations blush for their mythology') is, that at first morals had no influence whatever on the conception formed of the gods. Ethics and religion were absolutely independent of each other." (P. 177.)

"We have seen that every nation begins by admitting the real existence of the gods adored by its neighbors. The Israelites in the period of the Judges believed in the sovereignty of Chemosh over the people of Moab, just as much as in that of Yahveh over the people of Israel." (P. 204.)

"When a nation lost its independence, its gods did not cease to exist, but passed into the service of the conquerors and became subordinate to their deities." (P. 207.)

"The highest point of development that polytheism could reach is found in the conception of a monarchy or divine family, embracing all terrestrial beings, and even the whole universe. The divine

monarch or father, however, might still be no more than the first amongst his peers. For the supreme god to become the Only God, he must rise above all beings, superhuman as well as human, not only in his power, but in his very nature. The conception of this new and higher nature is the fruit of metaphysical speculation. Monotheism is hardly complete until man, having conceived the idea of a first cause, of eternity, of infinity, and of the absolute, makes them the attributes of one only being, the Being *par excellence*. And these conceptions are not formed all at once in the human mind; they are the products of a slow mental evolution which acts upon materials already in existence, furnished by previous conceptions of the deity." (P. 211.)

At the close of his last lecture, "The Future of Worship," Count D'Alviella tells us that "God" may die, as his thousand predecessors, Baal, Odin, Jupiter, have died, and as the Israelitish Yahveh must one day die, but "what cannot die is the conception, enshrined in these names, of a mysterious and superhuman Power, realizing himself in all the laws of the known universe, revealing himself to man in the voice of conscience and the spectacle of the world."

The existence of deity as Unity, the action of deity as Harmony will remain forever, after the truth has freed the conception of the deity "from all the confusions which originally covered it, and the parasitical accretions which have since laid hold of it," and after these have been "stripped off, as so many borrowed plumes, anthropomorphic attributes and moral limitations."

To all interested in the relations between science and religion, to all who wish to see the great aid that anthropology, with its diverse branches, brings to the solution of the great problems that agitate, as they have agitated for millenniums, religious humanity, the Hibbert Lectures for 1891 will be welcome, interesting and instructive.

A. F. CHAMBERLAIN.

III. THE NEW ETHICO-RELIGIOUS MOVEMENT IN FRANCE.

The Future of Science. By E. RENAN. 1891, pp. 491.

This book is a youthful product, laid aside since 1849. His religion is the progress of reason and science, and this is his *Purana*. Old states were towers of Tamerlane, new are borne down by armor. A loftier ideal consciousness of the universe, or the highest glory of God, is the end of the world. But we work the switches without knowing our goal. We dream that the mark we hit was the one aimed at. Our destiny was never so obscure, and the ruin of idealistic beliefs may follow hard on the ruin of supernatural ones. Man's supreme pleasure is to see reality, and science gratifies our noblest craving. The only heaven it robs us of is a bogus bank note. It furthers God's kingdom. Thus the life of thought might command every moment. We must not found hopes on mental fatigue. All that is connected with the higher life of man by which he is distinguished from the animal is sacred, and deserves the passionate devotion of high-minded natures. Saint, artist and scientist together give an ideal which even if not realized will be to future generations what Christ has been to the past. If men are not born to be philosophers, for what are they born? He who does not grasp the higher meaning of life is wretched. A man with one eminent faculty which absorbs all others is far happier than one who is always discovering within himself new wants which he cannot satisfy. To know is the key-word of natural religion. It is the most desinterested of all acts. Science was once thought to be robbery of God, a sort of rape, *e. g.*, Prometheus and the serpent of Eden. The wish for a better state is the source of evil. Inventors

never committed their sacrilege while saying *cœlum ipsum petimus stultitia*. Later great acts of intellect are thought inspired. Theological explanations are put for psychological ones. Both science and morality help practical life, but the latter is not its motive, and on this low plain comment replaces religion. Philosophy hardly became practical till the French Revolution. Only science can give man now a creed and law. Morals will conquer politics. Humanity and even God will be organized scientifically. Science holds our future and will have millennial sway. It will make the creeds and solve the great problems. No race has flourished without its classics or a Bible as pabulum for its higher life, its humanism. Science is thus the most important thing in the world, the truest worship and service of God. The Benedictine congregation of St. Maur was a scientific workshop. Specialists like lexicographers need not always take the largest view. Who is the Architect who presides over all and to worship whom is to live? Science culminates in love. Comte lacks the humanities because he is not a philologist. Sociology is not that incoherent compilation of facts called history. Philology will kill the supernatural, and it has founded the modern spirit. One who introduced the study of Thibetic did more for the philosophy of the future than most philosophers. Criticism is a new method in philosophy. Genius only edits the inspirations of the crowd. Perhaps *æstheticism* is the word of the future in place of the word morality. Every nation should have its ancient sacred books. Periodical and contemporary literature swamps this till it seems an ossuary. Scientific specialties are the scandal of men of the world, just as generalities are the scandal of the savants. The state must patronize science by foundations. A critic must know how to admire. The purest joys of the pious believer are nothing compared with the search for and contemplation of truth. Science brings a deep peace of which the orthodox know nothing; yet it is said that a religion that is only for the few is not the true one, yet the ascetic is not blamed for seeking a higher perfection. Science is a consecrated vocation. The history of the world is the history of its education, and palingenesis. Let no men enter the modern learned world if he does not know psychology. Society should recognize culture as a religious need. Mental work is degraded if made a pleasure. German unity came through science. Religion is the word which resumés the life of the mind. Science is theodicy. Farewell, God of my youth; though thou hast deceived me, I love thee still. The time for saints has come again. Although ravens nest in steeples, the youthful tonsure grows over and leaves no trace, and yet a touch of illness may drive us back to the piety of childhood. God is the category of the ideal or the form which we conceive it. He alone is real. Religion is all. Wars are crusades, voyages are pilgrimages, theatres are mysteries, fairs are religious fêtes. Whether men eat or drink all is to God. The modern school is a remnant. The church, press, club, society, legislation, gymnasium, have all encroached on it.

Le Devoir Présent. Par PAUL DESJARDINS. Paris, 1892, pp. 82.

What is the way out of the present doubt and moral distress Not what is, but thought ought to be, interests us, and nothing can do so if it has not a duty side. We are in a state of moral wars and it is craven not to speak our inmost beliefs. Amidst all lies and egotisms are love and justice, duty, the ideal, destiny sure, or do we live and act without cause or sense by the absurd caprice of great Pan, or for the amusement of some malicious demiurge? There are greater questions than the divinity of Christ or even the existence of a personal God. Experience and reflection show me a dim point of light

in the dark forest of life, and cannot define the end of being, but good will is what brings us toward it. Negatives are those who tend to destroy, positives to reconstruct. Tolstoi, who rudely fortifies in us the vacillating belief that there is a law in life, is positive; Renan, who says the obstinate affirmation of duty is noble, but adds that the chances are that it is not valid, is a negative. When we think of Buddhists, Nihilists, de Lisle, Scherer, Darwin, Taine, Zola, the "negatives" with their moral anæsthesia seem to predominate. "Positives" are true Jews and Christian poets and philosophers, who assert moral ideals, Secrétan, Renouvier, Lacheher, Fouillée, Sully, Prudhomme. They are found in all vocations and many who live, and as well as thinkers, belong to this true and only "church." The positives now seem increasing and may prevail.

Half the world is yet sunk in love of money and sexual indulgence, eating and drinking, show and sloth and have lost the power to react to good motives. How do we really live, and what do we most desire is the touchstone; and how few knights of the Holy Grail stand this simple test? The chasm between our moral ideals and our lives was never so wide or so conscious. Hence sadness abound with badness. This is not the old romantic melancholy of Oberman, born of doubt about reality. Never were men so unhappy, and it is a good sign. How much literature, poetry, music and other art-work are born not of love or energy, but of a mere dream of love and power? The growth of the race is arrested, and doubt paralyzes us with uncertainty in petty as well as great choices and acts. Moral ideas are forces. E. Havet showed many traits in common to philosophers and Christianity, but the latter has energy and soul. As in childhood so in age, acts of sacrifice or conscience bring joy and enlargement and exultation, which is mystic but spiritual, and of which Plato, Plotinus, M. Aurelius, St. Paul, Emerson and many more have variously described. In the Crusades, *e. g.*, men were smitten with disgust of their personal interest and with indifference to life itself. Such grand motives of history will come again. Unanimity, association, solidarity is now the word; association to last must be desinterested, but egoism cannot associate. Africa, Alsace, Ireland, etc., are schools of justice. Individualism is a *cul-de-sac*, a means and not an end in itself. Quest of personal good is the source of all evil and union means asceticism, self-denial, need of sympathy. Opposing political parties sometimes commend each other. We feel about immortality as when watching a deep diver—sure he will come up, but uncertain just where, or when, or how; the dangers of a republic in France are accepted. Society must renew itself and believe something. Secrétan has shown in his admirable "*Civilization et la Croyance*" that democracy must be moral, that its safety depends on private efforts and inner missions. P. Verlaine's *Sagesse*, Puvis de Chavanne's *Le Bois Sacré*, and *Les Béatitudes* by César Franck show this re-nascent idealism.

The future is not a gift, but must be a conquest, and the writer expresses the greatest joy at being able to trace as on virgin snow a few of its features. "The Companions of the New Life," the title of his forth-coming work, must practice the communion of saints. Their pathway ascends. Only religion can control thought, and action social and political life. One may believe in the evolution of humanity, one in the coming of God's Kingdom, or again one in the development of personal liberty and one in obedience to God, and another in the imitation of Christ. There are two sets of synonyms. Our aim is larger than the church, as morals are larger than religion, which projects and symbolizes a part of it. This movement must not have a single article of creed, not even theism, or the whole catechism

will creep in. Christianity has long subsisted, but has not dominated. Metaphysics and idealogy are fragile. We must not be called neo-Buddhists, neo-Catholics, neo-Protestants, and still less is ours a new religion. We must not have any name. Fifty of the right positives united could conquer Rome with its 38 millions for the cause of common amelioration. The principle of re-awakening should be substituted for charity.

We should:—

I. Limit ourselves for a few years to the foundation of opinions.

II. Undo the evil literature has done for the last 40 years. Phenomenalism, tautology, skepticism, irony, mystery are confessions of incompetence in the presence of life's problems.

III. Condemn the vile literature which attacks feeble wills.

IV. Rather than to philosophize with all our might, as an old master directed, we should judge with all our souls. Seek and commend the good and condemn the bad more heartily. A few competent and courageous critics could accomplish great results.

V. Art must be penetrated by a morality more deep and serious.

VI. A bond must be established between all who believe in and practice the faith of the future. Scholars must follow current events.

VII. Have faith or consciousness of our moral progress, but it is immanent and must not be put in words, as if it could be got by reading. Action only clears up doubts and is the most immediate affirmative of the good.

VIII. We must work out an inner Christianity. Sin, redemptive grace, the results of asceticism, prayer, illumination by the Holy Spirit, humility, renunciation, hidden peace, etc., must be realized in our inner experience.

Protectionism and all state socialism must be avoided. Only responsibility teaches how to use liberty. We passionately desire all our ends, but know how feeble we are to attain them. This attitude is called prayer. May the kingdom of God come.

Idées Morales du Temps Present. EDOUARD ROD. Paris, 1892, pp. 316.

The author of this already noted book is a professor at Geneva. He seeks these "moral ideas" by criticising the ten authors whom he thinks have had and excited deepest ethical interests. These he arranges in a sort of a curve, of which Renan and Vogüé are the extremes. Renan starts a negative current which grew for 40 years, and re-inforced the pessimistic current of Schopenhauer and the naturalistic current of Zola. Purely intellectual temperaments like Bourget and Lemaitre yielded to while resisting it; Scherer yields, yet remains attached to old ideas; Dumas *fils* spasmodically struggles for morality; Brunetière defends tradition, while Vogüé takes his stand openly upon religion. This order of chapters represents the line of progress towards a positive current, which will carry the future with it.

I. Renan in 1848 represented an epoch of beautiful dreams, and in 1840 an age of deceptions and amiable skepticism. Despite his rancor against the church in 1848, he took life most seriously. Its end was mental and moral perfection; skepticism was an abomination. The end of life was moral perfection, as attainable as mental verity. Morality has an intrinsic and objectively positive value, and science is loved and pursued with the ardor of a saint. But his fresh first faith vanished. God betrayed him. Earth seems poor in virtue and empty. The transformed Sulpician has grown proud of his pessimism. The void left in his soul by the love of his early faith, his humanistic and scientific sympathies, never filled. His idyllic prosopopœias of simplicity, of pastoral paranymphs sought

vainly to restore in his soul a faith parched by 18 centuries of exegesis and as desolate as the modern Palestine, his visit to which coincides with his less pristine ardor. "Love does need faith," he said, and history has made it impossible. The "romance of the infinite" may take diverse forms. God is now a product of conscience, not the end of science; an attribute, and not a substance. Research and virtue are the only cult, but truth and morals are both subjective. Is this not flirtation with a chimera? Life is now for him a charming promenade across reality. He only wants a pleasant and sudden death, and wishes no life beyond, having enjoyed so much here. If perchance there be one, he expects to find the same goodness as here. Sins are only spots on the white rôle of humanity, and insignificant. God exists only in the spirit of sages, who would become saints. For all others he cares not.

II. Schopenhauer is taken more in earnest by his enemies than by his disciples. He is both pessimist and misanthrope. A collection of fine aphorisms and phrases from all literatures, makes his pages an arsenal of quotations. He blasphemed all, but found the resignation he preached in mental parasitism. His disciples were the disappointed, and his philosophy of despair became popular in France only just after the war of 1870. Later two bookish and introverted men joined his party. All his followers joined his ranks from external causes.

III. Zola is the brutal painter of great social disorders. His hour had come. He was admitted to the academy. Renan called him "positive," because he was a materialist and limited in his views. The world is today without mysteries, he says. He has dabbled in physiology and has learned little from it but the cocksureness often found in scientific men. One of his dominant notions of hysteria is very wrong, so is that of heredity. Science is his religion and he repels Christianity. But the former often, especially as he holds it, requires a faith greater than that needed to believe in the trinity and immaculate conception. He holds himself to be a moralist, but above all a naturalist.

IV. Paul Bourget is poet, novelist and the author of the remarkable essays on contemporary psychology. He can hardly be called either a "decadent" or a dilletante. He is is an aristocrat in tastes, and very fond of describing in great detail costumes, interiors, furniture and too much in love with modern elegance. He has a passion for livery, and his *un cœur de femme* is almost a code of elegance, toilets and menus. This is hardly humble in the Christian sense. Again his intelligence is one of the most complete and comprehensive of his class. Analysis weakens, it poisons and intoxicates. Men of great intellect are prone to be negative, contradictory, undecided. A psychologist so gifted cannot have the poverty of spirit often so essential in a moralist who would live as well as write, or even be concrete and take hold of the soul of the people. His adulteresses are made to seem almost irreproachable, so exquisite are their taste and dress, and so distasteful are their husbands. If a literary man must be an active moralist, Bourget's books are bad, but if he need not be a philanthropist, but a dissector of motives, they are good. He has inclinations which might be called Christian, as witnesses his preface to *Edel and the Disciples*. He loves progress, and sometimes reflects the spirit of the gospels, and to love the good of souls. He loves faith, and also skepticism, ethics and art, but lacks moral vigor to choose between them.

V. Lemaitre first appeared in an article reproaching Renan for having banished joy, peace of soul, and of mocking the world with metaphysical subtleties. He early wrote two little volumes of delicate, melancholy verse, and criticisms of Molière. He is very sup-

ple-minded and well read in French and in ancient literature. He was multi-lateral and had a Renan period. His changes each seemed a new avatar. In theology he would be but a poor clerk, and he could not live in the rare air of philosophy, but generally keeps himself armed with simple good sense. His hero, Serenus, had himself baptized, although he was an atheist, to please his sister, and because he loved the good simple hearts of Christians. His "psychology" is the struggle between duty and passion. He has two characters, viz., that of a man of letters with the temper of an artist, and that of an honest man with good sincere sentiments.

VI.–VIII. Scherer, Dumas and Brunetière we shall pass over here and conclude with the two last and most positive.

IX. Count Tolstoi. There is everywhere great need of moral tranquillity and equilibrium. Some of the new ethical conceptions in France have co-incided with the development of the Russian novels, which, despite their barbaric names, have found acceptance in the land of Goncourt and Zola. Tolstoi has passed through three stages, and these are normal and logical. First he wrote like others, for fame and money ("War and Peace," Anna Karenina). Next, having realized his ambition, he was not yet happy, and he studied his state and needs and wrote "My Confession and My Religion." Thereby these convictions are made practical and set at work. Hence the manual labor at Yasnaïa, Paliano, and his later writings. Tolstoi is not a mystic, and cares little for invisible objects of faith, or the transcendental generally. His *faith is the knowledge of human life.* God's business is not to relieve us of the instinctive dread of the destruction of our personality after death. Tolstoi is a simple moralist. Man is a traveler surprised while seeking water in a desert by wild beasts. He is finally able to cling to a tree, knowing well he can cling on but a short time and must soon fall off into their jaws. Meanwhile he finds a few drops of honey on the leaves near his tongue and laps them with voluptuous pleasure. His Kreutzer Sonata shows that there is at bottom hatred between the sexes — a hate ameliorated by habit, common interest, love of children, and chiefly by passion, but which, when this is gone, may break out with a violence that may become murderous. All his energy is put forth to discover rules for the conduct of life, and would reform our morals and social organization. Men feed themselves like a breeding stallion, he says, and are therefore as concupiscent. They should eat little and keep pure before and moderate in wed-lock. The fall of man was in living from the fruits of others' labors. All should work with their hands, and best of all in agriculture. Tolstoi is an apostle and is entirely right, says Rod.

X. Vicomte E. M. De Vogüé concentrates all his thought upon the present of human affairs. He is part litterateur, part journalist, but altogether unique. He was a soldier and a prisoner in Germany in 1870 and learned courage and patriotism, and then became a diplomatist. He does not withdraw from contemporary affairs to study the past, but feels the grandeur of the present, its immense significance and interest. Life is not pale or vile, but noble and palpitating, and hot with issues. Near 1880 French literature passed through a crisis of skepticism and indifference. It was fastidious and bookish, and ran aridly to adjectives and metaphors. It lacked direction and ran to individualism and even egoism. Vogüé traveled in the east and reported in his curious symbolic book *Vaughéli* (incarnating a collective soul in a fictitious personage), that personality vanished and only races were immortal in history. Not psychological curiosities so much in form then, but the souls of nations and their future as shaped by the present, was his quest.

Nothing could be worse than the certainty of absolute peace. Men would deteriorate. Nations must have a history, and must be schools of sacrifice, and cannot exist if composed of selfish money-hunters. To feel, direct and control these great unities is the master work of to-day. Yet Vogüé applauds heroism, and would give it a cult. One of his tales is of a poor colporteur who had himself condemned to save an innocent mother; another of the soldier Petrouchka, whose fife gave courage to the defenders of Bayazid; another of the girl student Varvara Afanasiérna, whose heroism was magnificent, although it proved a lost force. Vogüé breaks with the idea of art for art's sake. Literature must teach and console men. A writer should be a sort of lay-prophet and shepherd of souls, who has conviction about the future and can pilot towards it. Literature is not a venture, but a mission. These views and their author have taken a hold upon French students like those of few others, save Lavisse.

La Crise Chrétienne, Questions d'Aujourd'hui. Par Pierre Lasserre, Paris, 1891, pp. 298.

A fermentation, troublesome perhaps, but incontestable, is going on in the majority of thoughtful minds. The intellectual edifice in which we have been sheltered for forty years has ceased to please us. Resigned hitherto to the necessary hostility between social interest and culture, between democracy and art, we wish that the most intellectual were the most benevolent,—we dream vaguely of a social art. These tendencies manifest themselves in criticism, poetry, comedy, romance, in political economy even, by a deep and very mysterious *consensus* the analysis of which will always be the despair of the historian. We are too strongly inclined to believe that ideas prevailing in our own time are decisive and magnificent. They should be compared with former ideas of which they are the legitimate descendants or the negation, that we may appreciate their true originality. To do this with the philosophy of the nineteenth century is the object of this work. The profound melancholy, the strange suffering, wholly new, which has affected all the *natures d'élite* not under the control of religion or politics requires explanation. The writers of the past generation have suffered, but have not known how to suffer. They have played with and paraded their pain, they have produced a splendid literature, but a literature that is sterile and will probably not live. All philosophy, all science, has failed to touch the fact of suffering. There is more truth in the profound astonishment of simple souls when a great blow falls on them than in any other attitude, spontaneous or reflective. In that may be recognized the intuition of a natural mystery. The stoic, the blasphemer, and the extreme mystic all alike fail to profit by pain because the only way of profiting by it is to suffer with simplicity. Simple souls who have no preconceived notion, no principal or general view with which they must make facts harmonize can understand pain better than philosophers can. They touch the mystery directly. They practice by instinct the rule, "It is necessary to understand the unintelligible as such." The true principle of all changes in human ideas is an obscure desire which perturbs the conscience. Yet the desire is nothing until it results in action. What we need is a faith, a belief that supposes no dogma, no objective truth, that is not of the nature of thought but of action, and finds in itself disinterested reasons for acting. The young men who the past year have been dreaming of a pious militia need a watchword, a flag that will strike the attention and gain the hearts of the simple. Whether faith is the last word of this movement or not cannot be predicted, but it is prob-

able that the faith of the next century will manifest itself by some grand social work. The philosophers of the past century have believed that they saw, when in fact they only dreamed. The action of the century has been marked with sterility and disorder. It has given us many brilliant hypotheses of the future of religion and society, but it has simply projected its own ideals into the future; it has discovered nothing. All philosophy which seeks an explanation of man outside of man himself, which constructs a religion without taking into account the primitive religious instincts, is thereby false and futile. The inquietude of man concerning himself, his being, and the meaning of his life is the principle of all philosophy, all poetry, all serious effort of human thought. The study of nature has been the apprenticeship of the modern mind, but Christianity has been strong, has insinuated its powerful leaven into the conscience and the mind only because of and in proportion to its hostility to nature. The true question is, has the gospel created the only morality worthy of the name, or is it only the confirmation and magnificent illustration of a morality supported on other foundations and justified by other principles? What is it for the critic who has no thesis to defend, no audience to edify, that Jesus has brought into the world? Neither formalism nor spiritualism can reply, but in some higher and purer place than that occupied by either, where they meet and all in accord, unknown to themselves, the answer is to be found. Jesus has not wished simply to ameliorate or purify the moral world, whatever infinite extent one may imagine this amelioration to have, but to re-found, to re-construct it on bases before unknown. Humanity would perhaps have discovered the duties of charity, pity, goodness, self-forgetfulness, but in fact it is Jesus that brought them into the world. These duties were applied to relations already existing, and created nothing new. For a false conception, a barbarous misunderstanding, they substituted a just and pure image of the bond which unites man to his fellows. Christianity is a mode and consequence of a new love, the love of the supernatural. There are no Christian virtues, no Christian sentiments, but there is a Christian manner of experiencing sentiments, and of practicing virtues. Merit attaches to the intention not to the act, and there is but one absolutely good intention, that is to love God. But if the consciousness finds its peace only in the love of God, it does not follow that it can be elevated to this supreme height by the simple force of its own aspirations. The love of God is a gift. It surpasses infinitely all work of the consciousness; all that it can do is to open itself to it and recognize it. Such are the conclusions of M. Lasserre. His reasoning is not always easy to follow.

E. M. H.

IV.—CHILD STUDY AND ANTHROPOLOGY.

Die Periodicität in der Entwickelung des Kindesnatur. G. SIEGERT.

Our chief need is to know the laws of development of child nature. Typical individual children are described as follows: 1. A very gifted boy who has long led his class. Now for some time he is inert, lazy, blundering, till some illness is feared. Soon he revives and is as before. These variations recur several times, gradually diminishing in extent and frequency. 2. A girl of nine who had been a pattern of order, diligence and propriety. Now for some weeks she is obstinate, untruthful and untidy. The parents cannot explain the change. Gradually these bad traits vanish. 3. A very strong, healthy boy of 12, a picture of health and vigor, the leader in all athletic sports and games. He becomes lazy and moping and moody. The doctor can find nothing, but his appetite is reduced, and his mood is dumpy. In a week all is past and he is his old vigorous self. 4. A girl usually muddle-headed has a period of lucidity and good lessons, but what is gained in one direction seems lost in others. 5. Children are at times abler in imitation and at other times in independent thinking. Memory work and creation alternate. 6. A boy with great mental gifts neglects his usual physical exercise in cramming for examination, falls into a state of mind and a mood that threaten mental health. He is righted by a restoration of the old regime. 7. An able boy had a sudden passion for athletics that disturbed the equilibrium between mind and body. He grew rapidly tall and at the same time stupid, and symptoms of disease appeared, but all came right later. 8. After diphtheria much learned before is entirely lost, and moods and ability are subject to great and strange fluctuation. Regularity is slowly re-established. 9. Too hearty or too much food or drink make development irregular. 10. Harsh treatment, psychic shock, excitement or anxiety cause sudden disturbances that may lead to permanent disorder of mind or body.

Everything is constantly changing in children. The above instances, which could be indefinitely extended, are typical of what is the rule rather then the exception. Now mind, now body, or now the good and now the bad, or now strength, now weakness, gets the upper hands. All children show slow or sudden greater or less transition from one form of dominant vital activity to another. The line of development and growth zig-zags toward its goal. Growth is rhythmic like the tides. Excessive and depressive, variation and conservative tendencies succeed each other. The first five examples above show regular, the last five irregular changes. Some of these changing phases become permanent and some are lost. Besides the periodicities of the single organs, of the day, week, month and year are the following stages: a. From birth to teething, where the senses are chiefly active. This is the intuitive or object lesson epoch; b. Between the end of teething to puberty, the legal school period, the child is conceptive and imaginative; c. Till complete sexual maturity comes, a period of thought and logic. In the third and fourth, and also in the sixth and seventh school year, are signs of retrogression and need of rest, but below and between these periods falls a period of unrest and often destruction and carelessness often ascribed to overpressure, but in fact only a natural periodicity norm. The greater the advance in the active periods or directions, the greater the reaction or retrogression in the passive periods. Periodicity then in all spheres of childish development is natural and normal. Both internal nutrition and individual external and social change are causes.

Education is the science of child nature and the art of its development. It must unfold individuality, which always has its own peculiar form of periodicity. The first year of school life, also the third and fourth, sixth and seventh, should require less work. The great need now is painstaking, long-continued, individual child study.

J. Trüper, the director of the institution for defective children in Jena, sends the following questions to the parents of his pupils. (Zeitschrift f. Schulgesundheitspflege, 1892, No. 7, p. 325-327.)

I. (1) Name, place, day and year of birth, present residence, confession. (2) Name, occupation, residence of father, mother or guardian.

II. How far has the physical development been abnormal? (1) Is there any special report in regard to the birth of the child? (2) Was the child nursed? By whom, and how long? Can any unfavorable influence have resulted from this? (3) How often has it been vaccinated, and when? Were changes noticed after vaccination? (4) When did the child learn to walk? When did he learn to speak? How did the acquisition of speech progress? (5) When did enuresis at night cease? (6) What diseases has the child had—measles, scarlet fever, diphtheria, scrofula, eye and ear diseases, epilepsy and so on? (7) Have direct or indirect injuries of the head, concussion of the brain or the like occurred? If so, what was the result? (8) Have mental diseases, diseases of the brain, nervous diseases, especially epilepsy, drunkenness, peculiar characters, mental weakness and so on, appeared in the child's family? In what relationship does the child stand to the persons thus afflicted? (9) Are the father and mother related by blood, and if so, how near? (10) Has the structure of the body (of the head, neck, breast, abdomen, skin, teeth and so on) striking characteristics? (11) Is there anything unusual in the attitude and gait? Is the child inactive, slow, quiet, lively, uneasy, excited and so on? Does it walk bowed over? With straight or bent legs? (12) Are the hands normally formed? Do they feel warm, or cold and flabby? Does the child grasp with the right or the left hand? Can it open and bend its fingers a long time? Can it eat and drink alone? Can it completely dress and undress itself? (13) Is its digestion normal? Or are there disorders, and what?

III. Is the child's mental life normal? Or do striking weakness, one-sidedness or disturbances appear? In the latter case (1) do disturbances of the senses occur? (Easy excitation of the sense organ or dullness of it, hyperæsthesia of the skin or anæsthesia to dermal stimuli, caused by heat, cold, a blow, pressure, tickling and so on.) (2) When, and in what, did it fall behind other children of its own age? Were other striking abnormalities noticed, and what? (Weakness of memory, lack of attention, distraction, mind-wandering, lack of the faculty of comprehension, of imagination or the opposite characteristics in a striking degree?) (3) Has the child already been instructed? Where, by whom, and how long? What was the result? In what subjects is it most capable? In what subjects is it least successful? What is the supposed course? (4) How far have the ideas of color been developed? What colors are discriminated? How far are the ideas of number developed? How far the ideas of time? (5) How far can it repeat anything freely and intelligently, and what? (6) Are disturbances of speech (stammering, stuttering, lack of ability to pronounce certain sounds and so on) present?

IV. Have abnormalities in feeling been noticed? (1) Is the

child cheerful or sad? (2) Has it morbid states of anxiety, and how do these appear? (3) Is it sympathetic, indifferent or pleased at the misfortune of others? Does it like to tease others, or is it peaceable? Is it generous or selfish, social or retiring, benevolent or wicked? Is it peaceable, or does it quarrel easily? Does it show itself peevish, scornful, violent, quick-tempered and so on, and on what occasion? (4) Does it have normal love for its parents and brothers and sisters? Does it obey willingly? If not, how does its disobedience show itself. (5) Does it show traits of character that are dangerous to others? And how do these reveal themselves? (6) Does the child give special difficulty in its education in other ways? If so, how? (7) Has it special habits, talents, peculiarities and affections?

V. Are its activities normal? (1) Does it like to keep itself busy? (Does it learn and play?) Does it do this by itself? (2) What is its favorite employment? (3) Is it skillful or awkward in practical things? (4) Is it hindered in its activity by any lameness or stiffness in its organs? (5) In what has it special interest and skill?

VI. (1) Can other special causes be found for its abnormal mental condition, such as errors in education, physical and mental over-pressure, or long-accustomed inactivity, violent emotional excitation, great fright or anxiety or fear? (2) Are its abnormal conditions continuous or intermittent? In the latter case do they appear periodically, and at how long intervals? (3) What medical or educational means have hitherto been employed for the removal of the abnormal conditions? By whom and with what results?

W. H. B.

FRYE, *Mind Charts*, San Bernardino, Cal. 1891, pp. 15.

Mental power, not information, is made the test for promotion in the schools of San Bernardino. The charts are arranged for three grades, primary, middle and high. For the primary grade are given directions for making and recording simple tests for the *perception*, *imagination* and *memory* of color, outline, form, number, rhythm, pitch, etc.; *morals* and *habits;* and *expression* in speech, writing, singing, modeling, etc. The observations for charts 2 and 3 are based chiefly upon the subjects of study. Superintendent Frye reports very gratifying results from the use of this means of testing for promotion. He invites criticism and suggestion.

Die Ermüdung, VON A. MOSSO, Leipsic, 1892, pp. 333.

This German translation from the Italian is by I. Glinzer. Near the end of March when quails migrate from Africa to Italy, they are so fatigued they are easily shot and even caught in the hand. They arrive so fatigued that they are half blind, cannot rise over obstacles, kill themselves by striking against prominent objects; thus the Israelites of old found them. Pigeons must have a good home and being home-sick, have even crossed the Atlantic ocean. The curve of a fatigued muscle begins later, rises slower and not so high and falls off more gradually than that of a fresh muscle. Mosso's *ergograph* shows the most diverse curves of fatigue for different individuals and under different circumstances for the same person. With some the contour of a series of lifts is convex, with some it is concave. Both muscle and nerve have their own peculiar curve when stimulated directly. Fatigue is a sort of poisoning by the chemical products of decomposition. Active muscles have an acid reaction and contain more that is soluble in

water. Muscles at rest are alkaline and have more matter soluble in alcohol. The poison formed in corpses, or ptomaines, and the chemical products of the decomposition of albumen or leucomaines, the poisons developed by the bacilli of typhus, tetanus, diphtheria and tuberculosis, and the substances produced by overworking the brain and all other organs, are drosses which if not burned up by aid of the oxygen of the blood, destroyed in the liver, or excreted by the kidneys make us fatigued, or even sick. Hence the blood of a fatigued dog is poisonous if injected into the veins of a rested one. Neurasthenia is marked by rapid and general fatigue and slow recovery. Circular insanity and Guye's aprosexia, or loss of attention due to disturbances of lymphatic circulation in the brain are phenomena of fatigue. While muscular rigidity is a phenomenon of coagulation of myosin, contraction is a morbid phenomenon not incompitable with health.

The work done by a fatigued muscle injures it far more than the same work under normal conditions. Half of a given quantity of work does not require half of a given time for rest. In fatigue the nervous centres must make a greater effort to gather energy from unusual sources. Let a contracting finger begin to lift the weight later and later as it grows tired, and when the weight is entirely removed, its absence is not perceived. In the morning a postman can tell far more accurately whether a letter is too heavy than he can at night. The children of the poor die in larger ratio than those of the rich. The former, according to Pagliani, at the age of 17 are only as tall as the latter at 14. Their lung capacity is also much less. In medical examination for military purposes Mosso could tell by the growth, size and flesh of the naked body the rich from the poor in Sicily. Everywhere motion is more rapid. Machines have brought a spirit of hurt. They work with no respect to the law of fatigue and so impose a non-human law upon labor. Women and children can tend them and their strength is valueless. A steam hammer in one blow does more work than six men can do in one day, and it strikes 100 blows per minute. They bring exciting and wearing noises, and they crush those who make inaccurate movements; and bring society even farther from all its ideals till the race is degenerating under the rage of effort and struggle.

Attention is the chief condition of mental fatigue. It may accompany partial sleep. In breathing the diaphragm seeks rest more than the chest muscles. Its action tends to a minimum in sleep. Breathing periods accompany attention periods, and so do changes in heart action and arterial tension. A few seconds of activity probably tires a brain cell. Some psychic changes occur with every respiration. Long fixation causes hypnosis. A beast of prey ready to spring on its victim is easily approached by the hunter, for its attention is fixed on one object and it is obtuse to all else. Blood is not the first and chief factor of attention. There may be nerves in the brain which reflexly make cells more active, as is the case with glands. Americans are so fond of laughter and tears because they are so exceptionally in need of rest and relaxation. Southern nations of Europe are quicker in their movements (e. g., better fencers) because they have more centuries of culture behind them. Fatigue causes many strange phenomena: color blindness, involuntary movements, hysterical symptoms, amorousness, hallucinations, prolonged after-images, and almost every kind of subjective and objective symptom suggesting the weaker points of body or mind. The phenomena of fatigue due to lectures and examination are full of interest. Both nerves and muscles are thus fatigued.

Le familistère de Guise, M. Fr. Paulhan, Revue Scientifique, Tome 50 (1892), 178-181.

This is an interesting account of the familistery, a socialist association founded at Guise by Jean-Baptiste-André Godin (born in 1817, died 1888). In 1880 the society, which had existed for some twenty years, was incorporated as a legal familistery, and in 1889 the capital of the association was valued at more than 8,000,000 francs (it had inherited a large portion of the wealth of its founder) and numbered 919 members. Details regarding the rules and management of the familistery are given. The author states that family life is not suppressed, and parents can keep their children at home or send them to the familistery institutions. Fr. Paulhan maintains that the results are satisfactory from a moral point of view, while the death rate is less and the birth-rate higher than in the town of Guise, and a sensible diminution in the mortality of children has taken place. A. F. Chamberlain.

Zur Psychologie der Landschaft. R. Wlassak, Vierteljahrsschrift für wissenschaftliche Philosophie, XVI. Jahrgang (1892), 333-354.

In this article Wlassak attempts to determine the nature of the "landscape-feeling." In a landscape the feeling of being surrounded and of being the centre of the surrounding comes irresistibly upon us. A peculiar tone is given to our feeling by the immutable character of mountain and valley, river and lake. Then there is the irresistible impulse to let our thoughts widen out beyond the horizon. Here the mind has a peculiar "Blick," the "Sehnsuchtnach den fernen Spitzen," that makes the poet long to be beyond the farthest mountain-tops. The various aspects of nature and the foreground that man himself has constructed have their modifying effects. In spring, for example, when even inanimate nature seems to feel with man, the landscape-sense is peculiarly excited. Landscape-gazing makes us dependent upon nature. Of the men of the Middle Ages our author says that with them "nature and sin were nearly synonymous; they knew a dependence upon God, not one upon nature." With them, then, the "landscape-feeling" was hindered and obstructed in its expression in language and in art. He cites the well-known story told of Petrarch, who ascended Mont Ventoux near Airgnon, in spite of the entreaties and admonishments of his friends and the people whom he met. When he arrived at the top, he opened the "Confessions of St. Augustine," which he had brought with him, and with deep emotion read the passage: "For men go to gaze at lofty mountains, broad expanses of sea, streams that rush mightily by, and the course of the stars, and forget, in so doing, themselves." The poets, too, read themselves into their landscapes. Faust is full of the spring; Mephisto winter-minded. The landscape reacts upon the observer, and our feelings change with age and years. Wlassak compares Claude Lorraine and Millet as landscape painters, selecting the latter's "Angelus" as a typical example of modern "landscape-feeling" as expressed in art. He also quotes typical passages from Goethe, Carlyle, Keller, etc. In another article which he promises, Wlassak intends to discuss the anthropomorphistic relations of the subject. A. F. Chamberlain.

Ueber die sogenaunte Conscience musculaire (*Duchenne*). A. Pick. Zeitschrift f. Psych. u. Physiol. d. Sinnesorgane, 1892, IV. 161-210.

Prof. Pick examines a set of phenomena occurring in anæthesia, first noticed by *Duchenne*, in 1848. Duchenne's patient could only

move the arm, etc., when the eye was fixed on the member. Since faradizing the muscles restored their normal use, he concluded that the power of carrying out voluntary movements is due, not to tactile, but to muscular sensation, which *precedes* and determines the contraction; he called this sense "conscience musculaire." Numerous similar cases have since been observed. Strümpell considers the disturbance cerebral in character, and supposes it the effect of a cataleptic state, brought on by closing the eyes. Binet holds that the effect of light on hysterical subjects is to raise all the organic functions; when this stimulus is withdrawn, by closing the eyes, their muscular energy is insufficient to carry out movements. Pierre Janet, Rumpf and others suppose it necessary that we know the position of a limb in order to move it; this knowledge is due, says Rumpf, to sensations, which may occur in either the tactile or the visual center; if an anæsthetic patient has no visual image of the position of the limb at the outset, no motion (at most a momentary trembling, says Janet) takes place. Exner considers the highest types of movement to be those controlled by sensory attention, and supposes that in the absence of tactile sensation its function of control is performed vicariously by the eye.

Prof. Pick holds that the phenomena in question result from "the disturbance of a psychical factor, *the attention*." In hysterical cases, as others have remarked, the field of attention is narrowed, so that even a small diversion of it suffices to disturb the movement. He describes numerous experiments of his own tending to prove this theory. Besides the loss of motive power, he found that speaking aloud was impossible when the eyes were closed. Any distraction of attention, such as a question addressed to the patient, made every kind of muscular activity exceedingly difficult, if not impossible. Thus the phenomena are much too general to be covered by Duchenne's explanation. Binet's theory is set aside by the fact that a screen interposed between eye and arm inhibited the movement quite as well as closing the eye, although the light stimulus remained. This disposes also of Strümpell's theory of a cataleptic state. Janet's theory is insufficient to explain the disturbances in other tests, such as placing a colored glass between the eyes (which remained open) and the arm. Pitres had observed that *rhythmic* movements were capable of accomplishment with closed eyes, while the author repeatedly found them disturbed also. If we suppose rhythmic movements to require less attention than non-rhythmic, this apparent contradiction is explained by differences in the degree of anæsthesia, while under no theory not based on attention is it explicable.

HOWARD C. WARREN.

L'Anthropologie Criminelle au Congrès de Bruxelles de 1892. M. LEGRAIN. Revue Scientifique, Tome 50 (1892), 487-497.

In this paper M. Legrain gives a brief account of the discussions at the recent Congress of Criminal Anthropology held at Brussels. The first question was one of principle: "Is there a school of criminal anthropology, and upon what can it be based? There are two schools diametrically opposed, one holding to the moral law and free will—the classic school of criminal law, as it is termed; the other, holding morality as relative but of evolutionary character and varying according to the multiple influences of heredity, social condition, milieu, education, etc., the anthropological school. At the Congress the partisans of the classic school were very numerous, but, with the exception of M. Meyers, who charged the anthropological school with ruining the principle of penal law and

tending to weaken repression, they were inclined to conciliation. MM. l'Abbé de Baets, Gauckler, Nyssens, Heger, Prins, Otlet, Van Hamel, Lahovari, Benedikt were the accredited and eloquent champions of this attempt at conciliation between the old school and the new, which was one of the distinctive events of the Congress. M. Dimitri Drill expounded the principles of the anthropological school. The Italian (Lombrosan) school was the subject of fierce attacks at the previous Parisian Congress, and at Brussels the question was again hotly discussed, and amidst the argumentation it seems to have been too much forgotten how great a debt we really owe to Lombroso. The idea of the existence of the criminal-born type was attacked by Professor (of anthropology) Houzé, of the University of Brussels, and M. Warnots of the same institution. The division of delinquents and non-delinquents is considered arbitrary, for absence of legal conviction by no means proves a man honest and free from vice. Other authorities who were anti-Lombrosan in their attitude were: M. Benedikt, who mistrusted statistics; M. Streuleus, who studied criminal stigmata; M. Masoin, who made a complete distinction between the morbid criminal and the common criminal; M. Garnier, who thought that if the criminal-born existed, he was diseased; M. Mieyejewski, who held that crime and degeneration were not universally synonymous, etc. M. Manouvrei considered the doctrine of transformism alone can be applied to criminal anthropology. M. Dallemagne presented to the Congress a valuable study of "The Functional Etiology of Crime," in which, while not denying the importance of milieu, he attributes to physiological factors the largest share in the etiology of crime. M. Lacarsagne divides criminals into three classes: *Frontals* (intellectual), *parietals* (impulsive), *occipitals* (emotional). M. Molet studied particularly crime in children, dividing delinquents into three groups: *Casuals* (délinquants d'aventure), *instinctives* (perverts, habituals, recidivists), *feeble-minded* (débiles intellectuels). To the last class belong the hereditary and degenerate deliquents, and those who by insufficiency of native talent fail to acclimatize themselves to their milieu. MM. Magnau and Ladaur treated of "Obsession morbide et l'obsession du meurtre," and M. Jelgersma showed the morbid origin of the characteristics of the criminal-born. M. Tarde presented to the Congress an interesting study of collective crime, "Les crimes des foules," and M. Denis, in his "La Criminalité et la crise économique," dealt with the influence of the social milieu on the rate of crime, the share of pauperism in acts of lawlessness. M. Legrain concludes his paper with suggestions drawn from the consideration of the etiology of crime and observations upon the practical aspects of criminal anthropology, subjects discussed by M. V. Listz, in his paper, "Aperçu des applications de l'anthropologie criminelle," M. Gauckler, M. Thiery, M. von Hamel and others. A. F. CHAMBERLAIN.

Une Colonie Pénitentiaire: Notes sur la Nouvelle-Calédonie. Revue Scientifique, 465–470. N. LEGRAND.

This is an interesting account of the French convict settlement on the island of New Caledonia; details of the life and society of the criminal population. The moral atmosphere is the lowest possible, and the inability of the magistrates to inflict the penalty of death renders the enforcement of such laws as exist rather difficult. The huddling together of all classes of the condemned is sure to lead to the complete degradation of the few whom different treatment might eventually save from criminal abandon.

A. F. CHAMBERLAIN.

Ethnology in Folk-lore. G. L. GOMME. London, 1892, VIII. 200 pp.

In this little volume Mr. Gomme, the president of the Folk-Lore Society of England, endeavors "to ascertain and set forth the principles upon which folk-lore may be classified, in order to arrive at some of the results which should follow from its study." In pursuit of this object the author discusses the following subjects: Survival and Development; Ethnic Elements in Custom and Ritual; the Mythic Influence of a Conquered Race; The Localization of Primitive Belief; the Ethnic Genealogy of Folk-Lore; The Continuation of Races.

Of folk-lore itself, Mr. Gomme says: "The essential characteristic of folk-lore is that it consists of beliefs, customs and traditions which are far behind civilization in their intrinsic value to man, though they exist under the cover of a civilized nationality." Mr. Gomme, treating of Aryan folk-lore only, comes to the conclusion that "race distinction is the true explanation of the strange inconsistency which is met with in folk-lore." It would perhaps have been better had the author brought to bear upon Aryan mythology and folk-lore more of the side-lights thrown by the study of the beliefs of the American aborigines, with regard to whom so much information of scientific accuracy has of late years been accumulated. In spite of the efforts of Lang and Tylor there is still too much of a tendency in some parts of Europe to settle questions of mythology and folk faith within the circumscribed area of Semites and Aryan, just as even now comparative philology has scarcely yet escaped from the leading strings of Indo-European godparentship. Mr. Gomme endeavors to get away from this feeling, but is not entirely successful, as, outside of the old world, his references are in the beaten track of Spencer and others who have been compilers rather than investigators.

Still Mr. Gomme has made a very readable and in its way a very valuable contribution to the study of folk-lore from the ethnic point of view, and an exposition of the theory that there has been no continuous evolution of folk-lore, but only survivals. His concluding words are these:

"The examples of rude people which have escaped the fatal silence of history show at least that, if there is evidence of savage usages and beliefs in folk-lore, there is evidence also of savage people who are capable, so far as their standard of culture shows, of keeping up the usages and beliefs of savage ancestors."

A. F. CHAMBERLAIN.

Les Proportions du corps humain. M. PAUL RICHER. Revue Scientifique, Tome 50, 1892, 558-564.

In this article, which is to form a chapter in M. Richer's forthcoming work, "Le Canon des Proportions du Corps," the author discusses some of the artistic canons of the proportions of the human body that have from time to time been put forth. For the Egyptians the modulus was the middle finger contained nineteen times in the height of the body. With the Greeks it was the palm of the hand (*i. e.*, the width of the hand at the roots of the fingers) the Polycletian canon, and perhaps also the height of the head, the Lysippian canon. With the Romans it was the height of the head or of the face and sometimes also the length of the foot. Modern artists have followed the Roman model. The statues of antiquity measure in height seven heads, seven heads and a half, and sometimes eight heads. The artists of the Renaissance, Leonardo da Vinci, J. Cousin, etc., have adopted the proportion of eight heads.

Anthropological statistics seem to fix an average proportion of seven heads and a half, with eight heads as the measure for exceptionally tall men. M. Richer enters into a detailed treatment of the canon of seven heads and a half with its subordinate measures.

A. F. CHAMBERLAIN.

Comment les Peuples Transforment leur Civilization et leurs Arts. Revue Scientifique, Tome 50 (1892), 418–428. M. GUSTAVE LE BON.

In a preceding article (Revue Scientifique, Aug. 24, 1889) M. Le Bon endeavored to establish the fact that superior races are unable to impose their civilization upon inferior races; education, institutions, beliefs—all fail to do this. The elements of a civilization correspond to certain modes of thought and feeling, that is, to a mental constitution which represents the past of a whole race, the result of the experiences and actions of a long series of ancestors. To change the civilization of a people, one must change its very soul. Centuries, not the present conquerors, can accomplish such a task. Superior races are not influenced by a foreign civilization more quickly than inferior races, and if they have adopted sometimes beliefs, institutions, languages and art different from those of their ancestors, it is only after they have slowly and profoundly transformed them and assimilated them to their own mental constitution. M. Le Bon's essay is very interesting, as showing the ethnic bias in adopted civilization, art and architecture especially.

A. F. CHAMBERLAIN.

V.—ARTS OF EXPRESSION.

I Canoni scientifici dell' Arte drammatica. PAOLO MANTEGAZZA. Archivio per l'Antropologia e la Etnologia, XXII. 1892, 89-99.

In this article, written in the facile and epigrammatic style which he so well knows how to use, Prof. Mantegazza proposes to base the art of acting upon certain scientific canons, for it, like all the other arts, ought to "derive its inspiration from the sacred fountain of nature, whose interpreter science is." The article was really called forth by the perusal of "L'arte del Comico," a work by Prof. Rasi, an ex-actor, now director of the School of Declamation in Florence. He criticises the ignorance of actors in regard to psychology, physiology and anthropology, taking especial pains to controvert the definition of gesture given by Rasi, "a movement given to our persons to express our thought," and his statement that southern peoples gesticulate more than those in the north, because of the effect which the climate has on their imaginations. The first thing those who would be actors ought to do is "to study nature, to throw themselves into the world of life, to observe attentively how men speak, how men move, when they are glad and when they suffer, when they are in love or in anger, when they despise or fall into ecstasies; when they feel all those emotions which form the paradise and the pandemonium of life." "Observe, observe, and still observe" is the great commandment to which the artist of the stage, like the sculptor, the painter, the poet, must bow. Out of life he must learn so that the gestures he makes may not be like those of the modern stage, false and often clumsy, but like those in nature, true and often beautiful. But the actor must discriminate and select, he must transfer to the field of art what he has taken from nature —in brief, from a photographer he must become a painter. Mantegazza then defines gestures to be "those muscular movements which are not absolutely necessary to complete a psychic work or

function, but which accompany it by sympathy of influence." Gestures are involuntary or automatic (*e. g.*, the swinging of the arms in walking) and voluntary (*e. g.*, certain movements of the arm and hands in anger and pleasure). Now, the tendency is for the actor, too ignorant or timid it may be, pre-occupied with the audience that is gazing at him, to suppress these automatic gestures, which he ought to make spontaneously and naturally, and would so do were he not upon the stage. Prof. Mantegazza remarks: "We do not teach our infant crying, laughter, or anger, but mediocre actors on the stage never laugh, weep, or get angry naturally," because they "substitute for the automatism that is lacking a copy of nature which they have never studied." Thus they easily fall into the false, the absurd, the ridiculous. For "what," asks our author, is "naturalness—the alphabet of dramatic art—if not the faithful copy of nature?" And this alphabet all who tread the stage ought to know and to know well. Anthropology—the ethnic idea—here comes to the aid of the actor. All men laugh and weep, it is true, but weeping and laughter are different in the negro, the Indian, the Englishman; they are different in the woman and in the man, in age and in youth, in persons of nervous and of lethargic temperaments. The actor, coming before his audience, ought without opening his lips to be able to say I am a Frenchman, I am a German, I am an Englishman. The actor must indeed exaggerate a little the type gained by observation; here it is that he is an artist rather than a photographer. Mantegazza then sketches with epigrammatic brevity and skill the striking characteristic of five great ethnic types: The Italian, the Frenchman, the German, the Englishman, and the Spaniard, recapitulating in a single phrase the mark by which each is best known. The Italian is *æsthetically serene;* the Frenchman *ready to leap;* the German filled with the *thought that is whirling in his brain;* the Englishman's characteristics are *contempt and energy;* the Spaniard's, *calm and voluptuous arrogance.* The Italian is an artist in speech and in movement, the Frenchman a vivacious pleasure-seeker, the German a slow-moving philosopher, the Englishman a German without *bonhomie*, the Spaniard an Italian orientalized. Clothing, too, plays an important *rôle* in acting. In *quantity* it may vary from the square decimeter of cotton stuff, which covers the pudenda of the coolie, to the twelve petticoats which the señoritas of Entrevios are said to wear—together with a variety of laces—in addition to the ordinary articles of European attire. In the *mobility* of clothing there is *centrifugal* and a *centupetal* mimicry. To the tearing out of the hair, the biting of the lips and nails, the lacerating of the flesh, etc., correspond the pulling off and jerking of the buttons, ribbons, laces, and more fragile parts of the dress, and so on even to the almost complete destruction of the whole garment. Then there are movements that go with pleasure and love. Others accompany resolution and decision, such as the pulling down of the cap, the buttoning with rapid movement of the coat, and the like. After having found *true*, says Mantegazza, the actor must give us the *true beautiful.* Given a beautiful situation of Shakespeare or Molière, the actor may be able to express the *true* and yet not attain to rendering the *true beautiful.* "Make ten persons laugh for the same reason, and perhaps one alone will laugh beautifully, whilst others will laugh stupidly, disagreeably, or vulgarly." And so might we say also of all the emotions of which the human heart is capable. "There are women who weep so beautifully as to inspire in us the cruel thought of making them weep often in order that we might admire that scene of ideal sublimity." And again: "There are men who laugh with

such jolly and rubicund expansion as to dilate our hearts and lungs and to combat the blackest hypochondria." An actor's path is smoothed beforehand if he is born beautiful. Salvini, the "Italian Apollo," as the Parisians called him, gained much by his beauty, while genius was required to combat the influence of Modena's ill-formed nose. Of course, no actor can be great in all forms of the beautiful, and the *dramatically beautiful* lies rather in the expression than in the lineaments of the countenance. On the stage, the actor can be great in but one of the æsthetic forms—he may give us the grandiose beauty of Cæsar, the sublime beauty of Alexander; graceful beauty, picturesque beauty, adumbrated beauty, horrible beauty. Into this he must put his body, his face, the attitude of his genius, his individual mode of thought. What he needs is to be "ever in the truth, yet a little above it, neither the insufficiency of the too little nor the exaggeration of the too much." But always "the divine symmetry of the Greeks;" and the rules by which we are to attain to this end are to be sought in science, the fountain of all truth.

A. F. CHAMBERLAIN.

L'Art et la Poésie Chez l'Enfant. Par BERNARD PEREZ, Paris, 1888, pp. 308.

Mr. Perez's long observation of children has led him to lay great stress upon the power of early influence and education and to attribute much less to heredity than some writers, notably Rousseau, whom he several times quotes in order to express dissent. The difference in children of the same family he believes can often be accounted for by a change of nurses, by the difference between the mother and the nurse or by the changed circumstances of the family. To sex he attributes very little if any of the difference in the profession or development of the æsthetic sense in boys and girls. Here again education is the great force. The love of dress and ornament shows itself very early, but it is by no means a simple tendency, as the instincts in a greater or less degree are. It is encouraged or repressed by traits of character, inborn or acquired, but is chiefly the effect of education and example. In girls of five it is sometimes fully satisfied by clean clothing: in other cases, especially in families where the need of economy makes the care of the clothing a prominent part of the training, the dislike of constraint or discomfort produces an indifference or even a dislike to new or handsome dresses. If in the first cases we find in the child the highest feelings of civilized man, the absence of these, as in the second cases, does not indicate any approach to the habits of the savage, who will submit to any degree of pain to ornament himself according to the fashion of his tribe. Sex has no influence on this taste at the earliest age. Little girls are more likely to show their new clothes to other little girls than to boys, and little boys go to little boys for admiration and sympathy rather than to girls. The love of nature in children is an extremely complex sentiment. There is the stimulating effect of light and color, and the excitement caused by moving objects, which the human being shares with the lower animals. There is also the intellectual element shown in the constant use of metaphors, the play of fancy and the emotion of sympathy. It is sympathy which leads children to observe, to combine perceptions into symbols, thanks to which they make everything live and feel. The best endowed in this respect are those who have been taught by their parents, most frequently by their mothers, not only to look at nature, to see her beauty and grace, but to understand that she has a soul. It is

sympathy which prepares the young mind to conceive those higher analogies expressed by a living metaphor, analogies which the child cannot even guess the meaning of; the *majesty* of mountains, the *melancholy* of ruins, the *smile* of the blue waves. The children of peasants have little poetic or sympathetic interests in what surrounds them, because the interest in the land, its productions and the phenomena of the atmosphere on the part of parents are wholly economic and commercial. The conversation which they hear relates to the price of crops, the effect of rain or drought. Even under the stimulating influence of education the child of thirteen does not feel the beautiful and sublime as the adult feels it. It elevates and elates him, but the experience of life is a necessary antecedent to the sympathy and pathos which are elements of the adult sensations. However much children enjoy music, it is not to be supposed they they understand the real beauty of it. Their feeling is vague until it has been developed by education, theoretical and practical. Real musical enjoyment implies a somewhat high power of comparing, analyzing and combining to make the intelligent and not simply the sensitive praise. Too much wit or gayety in children's songs leads to waggishness, too much feeling to reverie or passion. Songs sung habitually to a child should be frankly and gently gay, should have the modest freshness of the sensations of home and family. A practice observed in America of having the singing in school confined to the chapel where all the pupils are assembled, is commended. The formal preparation for it in a place set apart is believed to encourage other than common sensations in connection with it. The singing of songs calculated to excite emotion should not be frequent. In this we may learn from the Greeks, who forbade the battle songs to be sung in time of peace. The æsthetic sense is shown in the prattle of children in their desire to please by good manners, in their love of pictures, attempts at drawing and their love of tales and romances. To reading, great influence is attributed. The emotions caused by reading may be regarded as action imminent or in reserve. The quality of this action will depend on the temperament and the character which heredity and circumstances, above all the early education and familiar examples have given the child. In general it is less the morality of the deeds and the elevation of the characters, still less the lessons of virtue, than the strong emotions, chiefly the emotions of pleasure, which charm the child in the romances he reads. Hence the reading should be watched, guarded, controlled, shared. The sympathetic element surpasses all other passionate tendencies. The literary, the critical sense turns aside to itself a part of the force of the feeling which fantastic reveries and disordered transports would tend to exaggerate. Hence reading should be social, should be interpreted and explained in the family. Since for historic man oral composition or descriptive recital has preceded written composition, so it does with the child, but the child should early be encouraged to write about what he sees or understands. If left to write as he talks he will learn how to write as he learns to talk or to think correctly. Apart from its scientific interest this book is exceedingly pleasant reading. It contains charming pictures of child and home life. M. Penz's sympathy with children is pervasive, and he evidently believes in the education that leads and guides rather than that which forces.

E. M. H.

PASSY, *Note sur les dessins d'enfants*, Rev. phil. 1891, XXXII. 614.

Simple objects were placed before a great number of children, ages three to thirteen, with the request that they draw just what they saw. The results are :

I. The reproduction, not of the object seen, but of an associated image frequently conformable to drawings of the object made by parents or nurses. This reproduction is drawn rapidly with confidence, while the reverse is true when the child tries *bona fide* to copy what it sees.

II. The outline given correctly, though modified in order to represent projections seen in relief, e. g., a full face is represented with a nose in profile, or in a profile the eye is drawn as appears in the full face, and parts unseen are supplied in the drawing. (Attention is called to a like peculiarity in many Egyptian and in some Greek bas-reliefs.) Foreshortening is absent. A book will be drawn rectangularly, however placed.

III. The distortion of parts; each part is drawn by itself without heed to the relations of size and position which unite it to the others. Error is accounted for by the natural utilitarianism of perception; the tendency, in obedience to practical advantages, to neglect certain elements in perception and introduce others.

Error 2 is not necessarily due to faulty perception, but rather to the lack of power to represent three dimensions upon a plane surface. M. Passy infers from error 3 that the *ensemble* does not exist for children.

University of Texas. WALTER LEFEVRE.

Die Musik als Hülfsmittel der Erziehung, Dr. A. REISSMANN, Wiesbaden, 1887, pp. 144.

Religion, art and science are the three educational powers. Music appeals to the *gemüth*. Its fullness determines the character and happiness of man. In it all virtues and graces root. Joyousness is a first duty of education, but it must not interfere with seriousness. It must be deepened. The religions teach what fables, and especially fit music can do. Song appeals to the gemüth most, as instrumental music does to the fantasy. School singing should start with the notes between g and $\bar{c}$. The entire scale is too much at first. Little one-part songs by ear should come first, and great attention be given to the position of tongue, lips, teeth and to quality of tone, as being the best way to sing first. Then should come test and breathing places. Tone being on vowels and consonants only deadening tone, the latter should be cut short. Range should first be extended downward. Notes should not come till children have made considerable progress in reading and arithmetic, and should be with a staff, and after explaining it write on it the notes of a familiar song. Heavy accentuation and beating time help. The conscious construction of the scale may come late, and majors and minors and part songs later yet. Songs that interest the children must go with and ornate technical difficulties. Volksongs are best of all. Spring songs must not come in fall, and music must fit the occasion and the mood. During change of voice e-f are especially dangerous for tenor and soprano. Christianity and later the Reformation sung themselves into the hearts of the people. Church, and chiefly Catholic church music, is very formative, and the choral is the best expression. The whole soul grows large and strong under the God idea expressed in music really inspired by religious feeling. Churchmen should not repress what the people feel, but impress them with nobler feelings and ideas. Tempo must almost always be slow, and especially with large audiences. For house music the dance forms, and as the root of all the waltz, come first. This began in time-beats and was given mobility slowly by melody. Dance forms express the mood of the dancers. The

Lautenists and Cembalists developed instrumental style independently, and then Bach first expressed the charm of the genuine life of the people in his sarabands, gigues, gavottes, bourees, etc. Then followed the minuette, scherzo, polonaise, mazurka, saloon music fantasies, nocturno, improvisation, etc. Songs are best of all here too and many are specified. The *Gesang-vereine* must carry on what the school has begun, and the concert institute develop the virtuoso. The opera should now become less external, and appeal more to inwardness. The author writes with copious illustrations of pieces for each topic, and would systematically reconstruct the entire musical system. His views are radical, but comprehensive. The book is so interesting and suggestive that it should be translated.

Elementar Uebungen, etc. K. BECKER. Berlin, 1888. pp. 24.

From mechanical to conscious singing is the rule. The first object of the teacher is that the child take as large a collection of chorals and volks-songs from school as possible. Their first stage is by ear. Drill in notes and rhythm; the dynamic and harmonic elements must come later. Thirty songs and one hundred chorals by heart is better for most children than all the power to read music that the school can give. Singing by ear cultivates that organ and tone memory. Voice training is best without notes. With the highest classes ear-singing should not be entirely dispensed with, no matter how well notes are read. Notes should come chiefly in the middle of the grammar school course, but singing should come at the beginning.

Das Volkslied als Gesangstoff. VON LETTAN. Dantzic, pp. 33.

The writer, who is head of a normal school, pleads for volks-songs in lower schools. These express the feelings of people and nations, and not merely those of a single artist. They are the oldest lyric poetry. First come love songs, then the more sad and epic ballad. The creative power of the German people ceased after the 16th century. In selecting these the words must be poetic, the songs must fit the child's heart and mind, must touch home, school, church, state, nation, must be good melody and fit the text, must be sung well, and is best sung in one or at most two parts, and with due expression. To this the words must be first read and explained.

Language as a Test of Mental Capacity. HORATIO HALE. Trans. Roy. Soc. Canada, Vol. IX. 1891. Sect. II. 77-112.

In this paper, Mr. Hale, who is best known of recent years from his theory of the variation of languages through the linguistic instinct of children and by his advocacy of the position that "solely by their languages can the tribes of men be scientifically classified, their affiliations determined, and their mental qualities discerned," discusses at length mental capacity as related to language. After stating that with Mr. Chauncey Wright he fails to understand how Alfred Russell Wallace can maintain that "natural selection could only have endowed the savage with a brain a little superior to that of an ape," he proceeds to remark: "As we have every reason to believe that the first human beings were as tall, as strong, and as active as any of their descendants, so we have equally good reason to believe that the language which they spoke was as well constructed and as expressive as any language that is now spoken." Capacity for speech, Mr. Hale thinks, has nothing to do with culture and to speak of "barbarous languages" is just as absurd as it

would be to talk of barbarous complexions, barbarous hair, or barbarous lungs. His contentions are illustrated by references to languages of primitive peoples, especially the Tinneh of northwestern Canada, which form of speech contains many peculiarities which are as clearly inflections as are the corresponding forms in Latin, and the language of the aborigines of Hunter's River and Lake Macquarie, in New South Wales, Australia. Regarding the Australians Mr. Hale believes: "Thus the Australians, whom some too eager theorists have accepted as the best representatives of primeval man, prove to be the offspring of one of the most highly endowed races (*i. e.*, the Dravidians of India, who have influenced much the Aryans of India) of southern Asia. Their present low condition—in which, however, the degradation is more apparent than real—is simply the result of hard surroundings, against which, in their situation, the greatest force of intellect could not successfully contend." The evidence of progress and of energies which lead to progress is not simplicity, but complexity. The simplest forms of animal life are the lowest, the most complex are the highest, so with inventions, governments, etc. Therefore "the complexity of the American and Australian languages rightly regarded, is the evidence, not of poverty of the powers of abstraction and analysis, but of the very reverse." Mr. Hale's article, coming from one so well qualified to deal with the matters discussed, will no doubt call for thoughtful consideration and examination of the arguments therein put forward.

A. F. CHAMBERLAIN.

The Festal Origin of Human Speech. J. DONOVAN. Mind, N. S. Vol. I. 1892, 325-339.

Starting with the theory that "the habits of music making are found to have a closer connection with speech the lower down we go in the scale of human development," and the reports of travelers that "aborigines are found uttering measured sounds with no meaning at all for hours; sometimes the sounds possess the meaning of a single word; or, again, the meaning of a phrase, but in every case the sounds appear to fire the imagination with the deepest meanings," Mr. Donovan endeavors to human articulate speech as a development from the musical and vocal sounds which arose amid the wild festal excitements of initiations, celebrations, marriages, funerals, war-expeditions, etc., in primitive times. "When a horde once acquired the habit of festal excitement, they would have an inducement to bring regularity into the movements and sounds produced through the physical energy of the excitement." They would bring the movements of the body, the beating of sticks, etc., and their cries into a more or less orderly succession, and in default of musical instruments, which at this early stage of human culture did not exist, they would naturally have recourse to the human vocal organs. The articulate sounds, "coming into existence through the help they offered in preserving the elements of feeling belonging to festal play," gradually became orderly with the order that asserted itself in the sensations and perceptions of festal players. Mr. Donovan illustrates by examples of supposedly primitive festal syllables the gradual transformation of these into meaning and significant words, and "the permanent use of one grammatical tool would mean the swift creation of the need of others; and the vocal material for them would be supplied in plenty always by the impulse to supply the articulate food for aural absorption."

One cannot, however, but think that the author is seeking to ex-

plain too much of speech "by" festal excitement, as other advocates of special theories have also done.

A. F. CHAMBERLAIN.

The Study of English Literature. A Plea for its Recognition and Organization at the Universities. By JOHN CHURTON COLLINS. London and New York, pp. 160.

This book is not a text-book, neither does it elaborate any particular system of teaching English literature. It is a vigorous and telling appeal for more sympathetic study on the historical and spiritual sides of this subject. The immediate occasion of the book was the effort which, some two years ago, was being made to introduce into the University of Oxford such a study of English literature. This attempt had once been defeated by the strong sentiment in favor of a purely philological study of English, and now the test is to be made again. The objection to this higher study of the literature is that it "legalizes superficiality;" literature, as such, is largely a matter of taste; how then can you apply a rigid system of examinations? Mr. Collins, in discussing the two methods of study, draws the lines clearly and sharply. He says all that can be said for philological study; in spite of its pages of notes, annotations and emendations, he finds something to commend; he grants for it habits of accuracy and thoroughness, and within certain limits he admits that it trains and strengthens the memory. He frankly says, too, that the system of study which he advocates might, if abused, lead to a dilettantism, which is a far greater evil in itself than the pedantry of the philologist. But to the critical study of literature philological study is as psychology to anatomy. "The scalpel which lays bare every nerve and artery in the mechanism of the body reveals nothing further. The Agamemnon and Macbeth are as little likely to yield up the secret of their life to the verbal scholar."

The book shows, in an admirable manner, the results of such methods in the study of Latin and Greek. It is this sort of study which has made these languages doubly dead to us. They are arraigned before the progressive educational spirit of the age as valueless; and yet mere philological methods are insisted upon for a living language, and that, too, one in which we should feel the deepest interest. The classic dead languages are of value only as they live in the hearts of living men, only as their literatures are linked to living literatures. Conversely, on historical and critical grounds, English literature must be studied in close connection with those literatures from which it largely draws its inspiration. Thus a study of Milton would involve a study of the great epics, the Iliad, the Æneid, the Divina Commedia, to which he was indebted. Pope and Wadsworth can be appreciated only through familiarity with Horace and Plato. In chapter six we have extracts from letters relative to the movement of four years before, giving the views of eminent men regarding the instruction in English literature as literature in the universities. It is interesting and significant to know that such men as Prof. Huxley, Cardinal Manning, Prof. Jowett, and Canon Farrar are in full sympathy with the movement. With this system as applied to English schools we are not concerned. Yet one can see that it is essentially the same spirit which prevails here. There is a growing belief that what has been done for the physical sciences can be done also for the humanities. Already the laboratory method has been applied to historical studies, and a beginning of this work is being made in literature.

Mr. Collins' view of the German language and literature in their relations to our literature seems rather depreciatory. He says in effect that if provision is made for courses in other modern languages—the French and Italian—then, if there is time, the German should have its place. In view of the fact that Coleridge and Carlyle and a score of lesser English writers drew their inspiration from this source, and admitting as we must the influence of German literature on modern thought, this indifference is noticeable. But the tone of the book is admirable; enriched as it is by constant reference to classic writers and their works, it is full of suggestion; although it is a case of special pleading, it is dignified; and even if it fails to accomplish its particular purpose, it will still have its influence with men who are not hide-bound by traditional methods.

Manual Concepts; A Study of the Influence of Hand-Usage on Culture Growth. F. H. CUSHING. American Anthropoligist, V. (1892), 290-317.

Accepting the three great steps in the intellectual development, the biotic, the manual, the mental, Mr. Cushing discusses nature of manual concepts and the relation of the use of the hand to the evolution of culture. Amongst the topics treated of are these: Evidence of hand-influence in the formation of terms in spoken language; right and left handedness as affecting the development of spoken numerals, and as affecting the development of recorded numerals and writing; influence of hand usage in left and right finger-counting on ceremonial successions, etc. Mr. Cushing, who is an accomplished scholar in the language of the Indians of the Pueblo of Zuñi, accompanies his arguments with elaborate etymological analyses of Indian words and expressions, the peculiar form of which is due to hand-usage in connection with speech. He thus expresses his views on the general subject: "By combining a sense of manual aptitude with the etymology of quantitive terms in at least the Zuña language, I will feel my way back, step by step, to the far ancient hand-conception and birth of many such terms. I think it can thus be shown that, while the creator of such terms has been the human will, the father of them has been the right hand, the mother of them the left hand; that numerals have been finger-made and sums hand-made; further, that single terms or monophrastic words of many sorts have been single hand-made, and sentence-words or holophrastic terms have as often been double-hand or gesture made." Mr. Cushing seems to carry his theory somewhat too far, perhaps, for example, when he says: "In this fashion the so-called verbal genders or inflectional devices for specializing mode or relativity in any one of these verbs of action have resulted, in a majority of instances, from efforts to thus suggest or picture in sound *particular* hand-relations to the acts, or rather *parts* of acts, or gestures of the actions of parts of actions, they signify. There was in this process grammatical inevitability. In itself it could not fail to effect complex yet mechanically systematic expression—thoughts or utterance—concepts in the minds of primitive men before or as fast as they evolved even approximately equivalent verbal utterance. So, in one sense at least, the literally manifold original languages of men were in old time born, as are the infants of men to-day, pre-natally organized and formed." Some of the etymologies of Zuñi words are very interesting. The numerals: One= "taken up to start with" (i. e., the little finger of the left hand was taken first to count with). Two= "dropped or put down together with that which" (because the next finger was held up and put down with the little finger in counting two). Three=

"partner equally itself which does" (because the third is the middle or dividing finger). Four= "all of the fingers all but done with" (because to indicate four all of the fingers except the thumb were held up and clasped down). Five= "the notched off, or the cut off" (probably the whole hand held up with the thumb separated or notched away from the other fingers). This minute analysis into which Mr. Cushing enters for many more Zuñi numbers, appears also in the higher figure. Thus, ten= "all of the fingers;" one hundred= "the fingers all of the fingers (done to);" a thousand= "the fingers all of the fingers times (done to) all of the fingers." Mr. Cushing in explanation of some of the points raised in his paper, refers to threshing-scores, the well-known example of the Roman numerals, the pictographic Chinese numerals, tallies, knots, Peruvian quipus and the like. The article is a valuable addition to the scanty literature on the psychology of language and we learn with pleasure that the author is preparing to discuss in another paper the "Interaction of Hand and Mind in the Growth of Culture." A. F. CHAMBERLAIN.

Erzieliche Knaben-Handarbeit. J. URBAN. Grätz, 1892.

This is a pamphlet of 82 pages, with thirty-eight large tables in map form, each with many tables and with explanatory text. The materials are paper, pasteboard and wood, and it is intended to connect the school with the kindergarten. The work is interesting and suggestive and contains some new elements.

VI.—SOME RECENT GERMAN LITERATURE ON PHYSICAL EDUCATION.

Jahrbücher der Deutschen Turnkunst. Geleitet und herausgegeben von W. BIER in Dresden. Leipzig, 1892.

Monatschrift für das Turnwesen. Herausg. von DR. C. EULER und Prof. Gebh. Eckler in Berlin. Berlin, 1892.

Die Leibesübungen des Mittelalters. Von DR. JULIUS BINTZ. Gütersloh, 1880, pp. 193.

Geschichte des Turnunterrichts. Von PROF. DR. CARL EULER. Band V. in Kehr's Geschichte der Methodik. Gotha, 1891, pp. 520.

Friedrich Ludwig Jahn. Sein Leben und Wirken. Von DR. CARL EULER. Stuttgart, 1881, pp. 634.

The German periodicals that head our list, besides essays on subjects concerning physical training, news, book reviews, etc., contain many historical papers and biographical sketches. One of the most interesting of the recent articles of historic interest is the translation (Jahrbücher, 1891, Hefte 4-8), by Dr. Fedde of Berlin, of what is, perhaps, the first treatise ever written upon gymnastics, and what is said to be the only Greek work existing upon the subject. It was written by Flavius Philostratus, who belonged to one of the noted families of sophists at the time of the Roman Empire. He lived first in Athens, then at Rome, some time in the first half of the third century. He was author of several other works. The treatise on gymnastics, "*Logos Gymnastikos*," was unknown until about a half a century ago. Some fragments of it were found by Keyser in a manuscript, and made known in 1840. The work itself was then found in a collection of books in a cloister at Athos by a modern Greek named Mynas. He made two copies of it. The manuscript itself was said to be ready to drop to pieces, and no

longer exists. Some suspicion has been cast on the genuineness of this work, but Fedde seems to accept it. The monograph has been translated into French, Latin, and German.

Philostratus begins his work by maintaining that gymnastics is a science worthy of being described in a memoir and referring to the legendary athletic heroes of the past. Then he takes up the different gymnastic exercises,—the pentathlon, boxing, and the pankration—discusses the physical characteristics that are helpful for boxing, wrestling, etc., and the best temperament; considers the diet of the athlete, and even the use of different kinds of sand. He refers to the heroic age and the hardy exercises then practiced. The gymnasts then contested in speed with horses and hares, sometimes were yoked with strong oxen. Their bath was in the streams, their bed on the earth, their diet barley-bread, meat and other coarse food. But in the later days, when luxury and Sicilian gluttony were introduced, gymnastics declined; and, finally, athletic prizes could be bought and sold.

Many of the important principles of gymnastics were first stated by Philostratus; and, though now commonplace, their first statement is worthy of notice.

The book by Bintz is somewhat popular and contains a great many interesting quotations from old poems and other literature. As a whole it gives, however, a pretty vivid picture of the different bodily exercises practiced in the Middle Ages; and the literature of the subject is given in a bibliography at the end of the book.

While the early Christians gave little attention to physical training, since education with them was for the world to come rather than for their world, and while nothing is said about it in the rules for the monks framed by Basel, the ancient Germans, on the other hand, were noted for their skill in physical exercises. All the ancient historians unite in praising their valor. Even Josephus says: "Who has not observed the strength of the Germans and seen their powerful bodies? Yet they have a spirit greater than their bodies, and a mind reckless of death." Bintz proposes in his investigation to see whether the Germans of the Middle Ages were worthy sons of such hardy and courageous ancestors—whether the praises given by the poets were fanciful, whether the Italian told the truth or not who said that the German boys learned to ride before they learned to speak, that they had lances longer than their own height, that they were accustomed to heat and cold, and succumbed to no hardship, and whether the words of Walther von der Vogelweide were true when he sang that the German training was the best and the German man superior to all.

From poems and other literature Bintz finds evidence that the five kinds of exercise that constituted the Greek pentathlon were practiced in the Middle Ages. Similar sports were practiced in other countries also. That running was a favorite exercise appears from many passages in the Nibelungen Lied. Running and leaping are mentioned also by Hans Sachs among earthly joys. Hurling spears, throwing stones, and jumping are united in one contest in the Nibelungen Lied. In these three exercises Brunhild's lover must contend with her, and if she surpassed him in a single one, he must lose his head. The seven knightly accomplishments mentioned in the Ritterspiegel were: First, riding; second, swimming; third, shooting; fourth, climbing of ladders, ropes and poles; fifth, tourneying and jousting; sixth, wrestling and fighting; seventh, to serve at table, dancing, gaming, etc. Of these the last three were very important, and throwing and leaping were included among the knightly accomplishments.

Die Stein stossen, Stangen schieben,
Fechten und Ringen,
Tanzen und Springen,
Stechen und Turnieren :
Damit soll man schöne Frauen hofieren.

The training began in early life. As soon as the boy was past the age of childish sports he must learn to ride, to defend himself with sword and shield, and must practice the mediæval pentathlon. Very violent exercise was frequently practiced, and sometimes rude apparatus was used. The French knight Boucicaut practiced dancing in a shirt of steel and hanging from a ladder in the same dress. And Rabelais says that his hero Gargantua practiced not only the usual exercises, but would run up the side of a wall and climb into a window as high as a spear, that he would climb a rope fastened to a high tower, and that he exercised on a rude horizontal bar made by fastening a strong beam between two trees. Many gymnastic feats of the mediæval heroes are recorded in literature. Many passages refer to the accomplishment of leaping into the saddle without a stirrup. An old proverb runs as follows: "*Das will mehr sagen als ohne Stegreif in den Sattel springen;*" and Shakespeare makes Henry V. say : "If I could win a lady at leapfrog, or by vaulting into my saddle with my armor on my back, . . . I should quickly leap into a wife."

The ancient Germans were expert swimmers, and throughout the entire Middle Ages they had no fear of water. The emperors Charlemagne, Otho the Second and Friedrich Barbarossa were famous swimmers. Among the northern nation swimming was one of the chief recreations in peace ; and in war they sometimes fought in the water. Among the Vikings a sea battle was often transformed into a horrible wrestling match in the water, the contestants swimming and diving until the weaker was drowned. The mediæval Germans kept up the ancient habit of bathing also. A bath was deemed a daily necessity. Bath-houses were found everywhere. Even small villages had one ; larger towns, a number. In Frankfurt alone, in the last two centuries of the Middle Ages, fifteen public baths are reported ; and the actual number seems to have been greater ; for in the list of citizens for the year 1387 twenty-nine persons are mentioned as bathers. Besides the public baths, in most of the larger dwellings there were private baths. Sometimes they were found in the houses of the peasants. In Ulm, in the year 1489, besides the public baths there were no less than 168 private baths ; and in many of the smaller dwellings bath-tubs at least. There are many proofs of the universal custom of bathing. The calendars of the time never neglected to indicate the most favorable months and planets for bathing. The first service performed for a weary guest was to give him a bath. The fees to servants were *Badegeld* as to-day they are *Trinkgeld*. In a Frankfort account of the year 1429 there is this item : "Two shillings to the workmen on the walls for baths." Many masters gave their servants special *Badegeld* on Saturdays. Abstaining from the bath was a special form of penance. Bathing formed an important part of the celebration at wedding feasts ; and in many places the knights must bathe the night before their promotion. From the custom the English order of the Bath arose. Bathing was deemed so much a necessity that it was not denied to prisoners. For example, in 1369 a distinguished woman in Regensburg was punished by being required to remain in the house for a year, but was permitted to go to confessional, to partake of the sacraments, and,

when necessary, to the bath. Those anxious for their future welfare established the so-called *Seelenbäder*, i. e., money was left to furnish public baths on condition that the recipients of the favor pray for the souls of their benefactors.

The bath-rooms became centers for social amusement, like the coffee-houses in later times. The separation of the sexes in bathing was merely nominal. Frequently refreshments were served on tables floating in the water. After a time the bath-houses became nuisances in many places, like the saloons of to-day. They were places for carousing and were often frequented by thieves. In Cologne in the fifteenth century the authorities had to interfere and limit the number of public baths. The Germans did not take seven baths a day like the old Romans; but they sometimes remained for hours in the bath. It was the custom on Johannestag to remain twenty-four hours in the bath. Two kinds of baths were common—water-baths and sweating-baths. The latter were sometimes steam-baths, sometimes dry-air-baths. Afterwards the public baths became places for the spread of contagious diseases and the custom of bathing declined. But the prevalence of bathing in the Middle Ages is in marked contrast with the hydrophobia among the modern Germans described by Lassar. (See *Ped. Sem.*, Vol. I., p. 425.)

Dancing was a favorite amusement throughout the Middle Ages. And some extreme forms of it prevailed. A sword dance in which the dancers jumped about between the points of drawn swords was a common spectacle at all public gatherings. According to one description, the sword dance began at the sound of the drum; the participants danced, now in a circle, now crosswise, now with great caution they jumped over the swords; again, they laid them in an artistic position, not unlike a rosette, and danced in a circle around them and jumped over them, and again held them high in the air, so that a rosette of swords was placed over the head of each one. Finally, they joined their swords and made a kind of platform of them, on which the leader of the dance stood, and which they then raised and held high in the air, while the leader delivered a brief address of thanks. The leader was then lowered again to the earth, and the spectacle was closed by another dance. At the beginning of the eighteenth century this dance was forbidden as dangerous and immoral; but it was continued in places even to the present century. Of ordinary dancing two kinds prevailed. Square dances and a kind of leaping dance. The latter was practiced out of doors, and especially in the springtime. This dance was the delight of everybody among the common people, and to-day there are survivals of the songs that accompanied it in some of the children's rhymes. The dancers gave themselves up to this exercise with great abandon; and this kind of dancing, according to Bintz, as the number of those who took part in it increased, became a dancing disease and was the beginning of the dancing epidemic of the Middle Ages.

The ball-play of the Middle Ages was of various kinds. Sometimes an iron ring was hung up and the players struck the ball with a bat and tried to drive it through this; sometimes the players divided into two parties, one of throwers, the other of catchers. The former threw the ball as far as they could; the others chased it and threw it back. Whoever of the throwers was hit by it must join the other party. Thus the play was continued until all the throwers were won over to the other side. This was a very common form of sport. Along the coasts of the North Sea a kind of ball-play was practiced on the ice. Wooden balls were thrown on the

surface of the ice. In Iceland large balls were used, and the sport was sometimes very dangerous. In one game it is reported that six men were killed. Polo also, was not unknown in the Middle Ages. Ball-playing was very popular at this time, as is shown by the numerous allusions to it by the poets of the Middle Ages. Often at the courts and in university cities, special buildings were erected for ball-playing. Even the monks were permitted to play.

The great public festivals of the Middle Ages were celebrated with contests of physical strength and skill. At the popular festivals of the peasants and burger classes, besides the shooting match, which was the great event, there were horse-racing, the performances of acrobats and rope dancers, and contests in such physical exercises as running, jumping and wrestling. A contest in rope-pulling called *Katzenstrebel*, or *Strebkatze*, was a favorite event. Proof of this is found in the fact that the expression occurs as a figure in literature. Of a man who does not live harmoniously with his wife, Hans Sachs says: "*Er zeucht mit seinem Weib die Strebkatzen.*" Among the knights the great festivals for tourneying and jousting put the highest premium upon physical prowess.

The church of the Middle Ages was opposed to physical exercise. This was natural since the ideal was the mortification of the flesh. The tourneying was especially forbidden by the church. In strong contrast to the education of the knights was the scholastic training of the monks, which consisted merely of the Trivium and Quadrivium.

The interest in physical training, kept alive during the dark ages by the popular festivals and by the aims of knightly education, and fostered by the humanists, declined as the use of gunpowder became general, and by the close of the sixteenth century it was almost dead. The bold and untamed German spirit had weakened; the student's motto, "*Frisch, fromm, fröhlich, frei,*" had been corrupted; the German Mick had taken the place of the old, hardy Teuton. Then came the Thirty Years' War with its moral and material ruin. But even in Germany physical education was not entirely neglected, and almost contemporaneously with its decline were sowed the seeds of its revival. The humanists, especially the Italian humanists, gave special attention to physical exercises. One may be mentioned particularly. In Mantua, in the early part of the fifteenth century, at the court of Francesco Gonzaga, Vittorino Di Feltre appeared. At first he educated the sons and daughters of the royal household, but soon his fame spread over Italy. Scholars from the great and wealthy families came to him from far and near, so that Mantua became an educational centre for the wealthy. Here first in modern times were physical training and scientific instruction placed on an equal footing in the school. The pupils had to exercise in riding, wrestling, fencing, ball-playing, swimming, and so on, and must harden themselves in every way. The most famous writers of the time in other countries—among them Vives, Luther, Rabelais and Montaigne—wrote more or less of physical education.

A little later, Locke and Rousseau stimulated interest in physical training; and, among the successors of the latter, two physicians, Simon André Tissot and Clement Joseph Tissot are of special note. The former wrote of the health of students, the latter of medical gymnastics. Tissot, the author of the book on the health of students (see Jährbucher, X., 8, pp. 194-203), was born in Switzerland in 1728, and the German translation of the work, *Von der Gesundheit der Gelehrten*, bears date of 1775. In this book he outlines in a remarkable way the principles of mental hygiene, which

are now commonplace, but fundamental. He begins by recalling that the ancients pointed out that mental work was liable to be detrimental to health. Celsus gave scholars warning of the dangers connected with their callings, and Plutarch did not approve of their sacrificing their health to useless sciences, and recommended the study of medicine to them. Tissot then mentions two chief causes of the diseases of students—constant mental work and continued physical inactivity; and he points out that, to understand the effect of mental work upon health, we must comprehend: (1) that the brain is active when one thinks; (2) that every part of the body becomes fatigued by activity; (3) that all of the nerves start from the brain; (4) that the nerves are a fundamental part of the human machine, indispensable in all performances. From these principles any one can see, he maintained, that, when the brain is exhausted by mental work, the nerves must suffer. The brain, the nerves and the stomach, which is well supplied with nerves, are the parts that suffer first and most from mental work. It is a matter of daily observation that mental work affects the stomach. The man who thinks most digests the worst.

The symptoms of nervous weakness are well described. The habitually courageous man becomes fearful of everything. The slightest illness seems serious. The patient is depressed and despondent, incapable of attention, loses memory, and his concepts become confused. Persons who constantly busy themselves with one subject are most liable to suffer; since only one part of the brain is put to strain. By such specialization the brain suffers just as the body suffers more when only a few muscles are exercised than when the work is divided among all the muscles. Alternation of work and rest is the surest means of conserving energy. Increase in flow of blood to the brain during activity is another reason why mental activity is liable to injure the nerves. Great men—Hippocrates, Plato, Plutarch, Bacon, Locke, Leibnitz, Newton and others—have, it is true, lived to an advanced age; but few have constitutions to endure such work; and they might have lived even longer if they had chosen a different mode of life. He has further some very excellent things to say about the evils of sedentary life. There is no part of the body uninjured by it. When one is sitting circulation in the lower part of the body is hindered; digestion is impeded; piles and other evils result. Students suffer, too, especially by work at night. Special stress is laid by Tissot on the advantages to health of cheerfulness. Students should mingle in society; for this conduces to cheerfulness. He condemns vigorously premature mental activity of children. Childhood should be devoted to exercises which strengthen the body, not to studying, which weakens it and hinders growth. Of overworked children he says: "In the beginning they are wonders, in the end fools." Passing to therapeutic means he places *rest* first of all. The student must be dragged out of his study and be forced to rest and to take recreation. He is quite eloquent in speaking of the advantages of rest. One's most lucky thoughts often come in the midst of recreation. In regard to physical exercise he gives also sensible advice. Exercise that involves the whole body is preferable; it must not be excessive, not violent after meals, and so on. The best means of keeping health is contentment, he maintains. "A good manner of life is the mother of happiness, and happiness is the mother of health."

A new impulse was given to physical education at the time of the philanthropinists. Prominent among the writers of the day upon this subject were Villaume, who called attention to the effect of

physical training upon mental development, and Dr. Frank, who demanded police supervision of sport and gymnastic exercise, and gave some good hygienic rules. Basedow, under the influence of Locke and Rousseau and the practical example of the knightly academies, introduced gymnastic exercises at Dessau. There were also military drills and foot marches; and the whole institution for two months each year camped out in the country. Here school gymnastics began under the instruction of Simon and Du Toit. Thus Dessau contests with Schnepfenthal the honor of being the cradle of modern gymnastics.

Guts Muths was the most famous gymnastic teacher of this time. In 1786 he was entrusted with the care of the physical exercises in Salzmann's famous school at Schnepfenthal. Salzmann had brought from Dessau certain physical exercises which were practiced somewhat by the children. Physical exercise was deemed necessary for the youth in order that they might be strong and well, but Guts Muths resolved upon more careful investigation of the matter. The result of his study appeared in his famous book, *Gymnastik für die Jugend*, which appeared in 1793. It was the first German book upon the subject, the foundation of all future instruction in school gymnastics. Among the authorities referred to in the book are men like Locke, Rousseau, Herder, Niebuhr, Fuller, Hoffmann, Tissot, Frank; and among the ancients, especially Galen, Plato and Lucien. Guts Muths' aim was not to educate gladiators and athletes, but to develop a thoroughly German gymnastics, and produce health, toughness and a manly spirit. The text of the first section is as follows: "We are weak, since it does not occur to us that we could be strong if we would." The new education, Guts Muths complained, had done much for better mental culture, but had almost entirely forgotten the body. The larger public schools limited themselves to mental culture, and the other educational institutions, with few exceptions, did nothing for physical education; hence Guts Muths earnestly recommended the revived gymnastics to all parents and teachers and to the whole nation. He recognized the hindrances and objections, and discussed them at some length. The objections were lack of teachers, lack of time, and an alleged self-confidence that resulted from strength and skill united with courage. But teachers could be found, time must be taken for necessary things, and the independence that was alleged to result would be a God-send.

Guts Muths did not have so high an ideal as that of Plato, who said that God gave men music and gymnastics for mental culture alone. He advocated physical training for utilitarian ends, for advantage in war and in daily life, while recognizing also its value to the mind. His views were expressed in the following principle: "Gymnastics affects the body directly, the mind only indirectly." The following ends were placed in reciprocal relation in his system: (1) Health of body and unclouded serenity of mind. (2) Hardening [of the body] and better regulation of thought and more manly thought. (3) Strength and skill, presence of mind and courage in danger. (4) Activity. (5) A good physique, beauty of mind. (6) Acuteness of the senses, truth of impressions and sharpness of thought. His definition of gymnastics was: "Work in the garb of youthful joy." In the second edition of his work he adds a second definition, as follows: "Gymnastics is a system of physical exercises which has for its end the perfection of the body." His ideal of perfection involved four things, namely, endurance, strength, skill and beauty.

Guts Muths discussed also concrete gymnastic exercises—jumping, vaulting, running, wrestling, balancing, dancing, military exercises,

etc. He gave much attention to swimming and bathing. He would teach the youth presence of mind on occasion of sudden danger, like fire, for example, by waking them suddenly out of sleep, and making them do what would be necessary in case of an actual fire. He added also concrete principles in regard to exercise. Gymnastic exercise should not be begun after a meal until digestion is completed; the morning hours immediately after rising, and the times immediately before dinner and supper are best; although the exercise should be completed ten or fifteen minutes before eating. The exercises should begin and end with light gymnastics. It should be out of doors as much as possible; and near each school should be a ground for exercise. Such matters are commonplace now, but fundamental. He advocated also physical education for women, not formal gymnastics, but daily exercise out of doors.

In his "*Turnbuch für die Söhne des Vaterlandes*," Guts Muths gives special attention to gymnastics as a preparation for military life. In 1796 appeared his classic book on "*Spiele zur Uebung und Erholung des Körpers und Geistes*." This is a most valuable collection of classified plays, and in the introduction to this he discusses the moral, political and pedagogical value of play, and the choice and classification of plays for pedagogical purposes.

There has been some discussion in Germany as to who was the founder of German gymnastics. Jahn is called the father of German gymnastics, but if he is the father, says Spiess, we must not forget Guts Muths, the grandfather. The latter has had a continuous influence through his writings, and hence may be called the first German teacher of physical culture, Schnepfenthal the cradle of German gymnastics, and the year 1786 its birthday, although Dr. Wassmannsdorf has claimed the honor for Dessau. The immediate influence of Guts Muths was also very great. Gymnastic training was adopted in private education in many families; and schools began to give attention to it. Baths and swimming schools were established. In the country schools in Bohemia, a weekly bath was prescribed by law. The universities also began to give more attention to gymnastic exercise. Guts Muths reports that in 1804 Karl Roux established a gymnastic institution at Erlangen, although not without opposition from individual "masters of learning" *(Meister der Gelahrtheit)*. The echo of Guts Muths' efforts was heard also outside of Germany. The *Gymnastik* was translated into foreign languages; and especially in Denmark practical gymnastic exercises were introduced. On the fifth of December, 1799, a public gymnastic institute was opened by Nachtegall in Copenhagen with the approval of the government. The Danish cadet academies and also public and private institutions introduced gymnastic exercises. Gymnastics obtained a place in the *Schullehrerseminarien*, and was thence introduced into the people's schools. The government decreed that every *Landschule* should have a place 4800 square feet in size for physical exercise.

A contemporary of Guts Muths was Gerhard Ulrich Anton Vieth. Vieth was born in 1763 and studied at the University of Göttingen, became a teacher at Dessau, and afterwards a director and school adviser. In 1794 appeared the first part of his Encyclopedia of Physical Exercises—*Versuch einer Encyklopädieder Leibesübungen*. The second part, which appeared in 1795, was devoted to the system of physical exercises, and the third part, historical like the first, appeared in 1818. Vieth was particularly fitted for this work. He was a practical gymnast, had thorough mathematical and anatomical knowledge; he was a great reader, and had the critical faculty of distinguishing between the essential and unes-

sential. A vast amount of information was crowded into this cyclopedia. The first part, the *history* of physical exercises, describes the physical exercises of the ancient Israelites, Phœnicians, Egyptians, Persians, Greeks, Romans and Germans, and reports interesting matters concerning the French, Spanish, English, Italians, Swedes, Icelanders, the modern Egyptians, Chinese, Persians, and the dwellers in Sumatra, Malabar, and the South Sea Islands. In the second part of his cyclopedia, Vieth treats of the advantages of physical exercise, citing the authority of Tissot. The utility of physical exercise seemed to him so clear, and the neglect of it so evidently a matter of ignorance, that one must restrain himself from useless declamations in favor of it. It is useful not only in giving physical strength, a beautiful physique, and so on; but it has an influence on the mind, increasing courage, giving renewed interest in mental work; and, not least of its uses, it checks premature development and misuse of the sexual impulse.

Vieth discussed plans for the arrangement of some sort of a gymnasium in connection with the schools. Small places could prepare a *stadium*, or a race-course, and a place for gymnastic exercises and sports. For the higher classes, places for riding, fencing, dancing and other gymnastic exercises could be arranged. The exercises must take place under the supervision of experienced teachers. These must, with the advice of a physician, choose suitable exercises for each pupil, and maintain a kind of military discipline among the pupils. Exercises should alternate; no jump should be made without the word of command; no bending of the limbs by violent external force should be permitted; there must be transition from easy exercises to difficult; emulation of the pupils must be appealed to; there should be no violent exercise immediately before or after eating; the choice of exercises must depend on the age, physique, strength and temperament of the pupil, and in many cases regard must be had to his future calling in life. Physical exercise, to remedy disease or deformity, must be prescribed by a physician. Vieth discusses also the mechanics of bodily motion, the lever relations of the bones and muscles, etc. In the third part of his encyclopedia, further contributions are made to the history of gymnastics.

Vieth agreed with Guts Muths, that with the public gymnastic instruction in schools gymnastic sports should be united. At the time of the public examinations, at Easter and Michaelmas, he suggested that a gymnastic festival might be given at which the youth should show their physical ability. "Perhaps," he says, "instead of questions by the teacher, and answers prepared beforehand by the pupil, a contest in the sciences and arts and in gymnastic exercises (a contest in music and gymnastics in the Greek sense) would not be unfitting and would arouse the interest of the public more than the usual examination." Applause, prizes, and the like would make the occasion a popular festival for youth.

Pestalozzi also wrote on physical training; and in his schools, both at Burgdorf and at Yverdun, he aimed to give gymnastics an "elementary" basis, finding its starting point in the child's body. This elementary basis was the power that the body has of making "joint-movements." Thus the essence of elementary gymnastics, according to Pestalozzi, consists in nothing else than in a series of purely physical "joint-movements," exhausting all that the child can do. This principle was stated by Pestalozzi in an essay "On Physical Culture," which appeared in 1807 in the "*Wochenschrift für Menschenkunde.*" Pestalozzi complained that

the teachers of gymnastics were rather teachers of particular physical exercises, such as jumping, climbing, vaulting, than psychological trainers of the physical powers of human nature. Such exercises were given children as something isolated, requiring one mechanical motion at the cost of others, and not as something in connection and harmony with all exercises of physical strength. Nature gives us the child, as an indivisible whole, as an organic unity, with many-sided talents of heart and mind and body, and she wills that none of these talents remain undeveloped. Nature develops each of these talents by means of the others. She unites all in one common centre ; she not only subordinates one exercise to another, but also derives one kind of skill from another ; just as in the tree, the trunk grows out of the root, the limbs from the trunk, branches and twigs from the limbs, the blossoms from the twigs, the fruit from the blossoms. In the ceaseless impulse for motion, nature has given the true starting-point of physical culture, and the outline of a complete elementary view of it. All a child's movements and play are nothing but joint-exercises ; hence the starting-point of physical culture is simple and universally applicable.

The final aim of gymnastics is to bring back a child's body to complete unity and harmony with his mind and heart. Gymnastics should give to the pupil's reason and will free and independent control of his body. The child should become master of his limbs, and maintain his power over them and over his whole body as over a tool of his mind.

Pestalozzi would have the pupils begin with such exercises as various movements of the head ; joint movements of the back united with head movements ; then joint movements of the arms in all possible combinations ; also, in connection with head and back-movements; joint-movements of the legs; and these again in connection with head, back and arm-movements. Thus the body with all its joints should be exercised in all possible movements. Pestalozzi would make gymnastics pedagogical. Such gymnastics is distinguished from military gymnastics in that it is free. The final result of gymnastics is complete regularity, but he would allow no pedantic attention to minutiæ or the like. Pestalozzi was, in the words of Euler, the real founder of free gymnastics ; and he anticipates certain modern teachings in a remarkable way. But his views received little attention at the time. Jahn does not mention his essay; and Von Raumer criticises his "gymnastics for dolls with joints." Although praising his views in general, the latter says that here, as in other matters, the fatal Pestalozzian habit of making everything elementary meets us. While an indifferent observer may laugh, the monotonously drilled child would like to cry.

Among other distinguished writers of the time who contributed something to the subject of physical culture were the philosophers Kant and Fichte. Niemeyer, Arndt, Meyern, and Jean Paul Richter also wrote upon physical exercise. The last mentioned writer in his Levana has some brilliant passages in regard to physical exercise. He recommends dancing as exercise for children, and says that the dance cannot come early enough, but the dancing-master is more likely to come too early than too late ; and children's balls are the chief steps to the dance of death. Of play he speaks with his usual insight. The cause of the cheerfulness of children is their activity. Play is man's first poetry. In early life the plays of children should assist mental development ; later ones should bring up the physical side, which is apt to be neglected by the schools. "Let the child toy, sing, look, listen ; but let the boy

and the girl run, climb, throw, build, sweat and freeze." There may be many plays, but there should be few playthings. For children in early years there is no better plaything than sand. "Children weary of play use it for hours as building material, as hurling machine, as a cascade, water for washing, seed, flour, finger tickler, as inlaid wood and raised work, as a ground for writing and painting. It is to boys what water is to girls. Only one thing has to be cared for with regard to it, that they do not eat their plaything."[1] Much instruction should be given through play. Pleasure and play-masters should be the precursors of the schoolmaster, and play-schools (like the modern kindergarten) should precede the schools for instruction.

Jahn, the father of German gymnastics, is a unique character in modern German history. Something of his fame in Germany may be judged from the amount that has been written about him. In Euler's biography, 46 pages are devoted to sources, authorities, bibliographical notes, etc., concerning his life. His great influence in Germany was due largely to his strong and interesting personality and to his intense patriotism. Some account of his life is necessary for an appreciation of his work as a writer and teacher. He was born in 1778. His father was a preacher. His mother was a woman of strong character, generous, modest, straight-forward, rugged, upright. He received his early education at home, and was allowed great freedom, but he acquired a delicate sense of right and wrong and an unswerving love for the German Fatherland. In 1791 he went to the gymnasium at Salzwedel. Here he was noted for great strength of body and great memory. He fought with the students and the youth of the town. His questions embarrassed his teachers; and, after three years, at their advice he left. Thence he went to Berlin, and entered Unter-prima in Gedike's school. Here, too, his ruggedness and independence of character soon put him on ill terms with both students and teachers. When one teacher told each student to choose for the subject of an essay some character in history who he would have liked to be, Jahn, to the astonishment of his teacher, wrote an essay to show how he would not and could not make such a choice, since it would be moral suicide. At Berlin Jahn remained but a few months, and in April, 1796, he went to the University of Halle. His university years were *Wanderjahre*. He visited ten universities and attended lectures at three—Halle, Jena and Greifswald. He became acquainted with the industries, the people, and the country of Germany. He believed in tramping and excursions, and maintained that by wandering about, one gathers the honey of life, by sitting still and remaining at home one consumes it. In his travels he gave special attention to forms of speech and collected a great number of old sayings and proverbs; and he could talk like a rhapsodist of the legends and customs of the German people. In his university life he was independent, always ready to take the side of the weaker party and to fight for any cause that seemed right. An enemy of the student societies, he was himself suspected of being a member of a secret order. Opposed to duelling, he was, nevertheless, always fighting. An able student, according to his own account he never wrote a prescribed task. One proof of his industry was his work *Ueber die Beförderung des Patriotismus im preussischen Reich*, which appeared in 1800, while he was a student at Halle. Some of his teachers recognized his ability; and among his friends were Krause, Sprengel, Eberhard and Friedrich August

[1] See Levana, § 51.

Wolf. Jahn had great influence with the students at Halle, united the so-called "wild" students or non-society men to him, and had hundreds of followers. But he quarreled with the university officials and was expelled. Then he went to Jena. Here, too, he had wild adventures, violent fights with the societies, and yet acquired great influence among the students. He is said to have been influenced by the French republic, and Danton was his hero. Next we find him at Greifswald, where he spent nearly a year before he was again expelled.

Two incidents in the student-life of Jahn are interesting as illustration of the paradoxical mixture of good and bad that frequently appears in a young man's life during the storm and stress period of adolescence. While at Halle the reading of Meyern's romance, Dya-Na-Sore, made a great impression upon him. In spite of gross defects as a literary work, this book contained many maxims of practical wisdom and was filled with a spirit of patriotism. "Virtue," said the author, "is impossible where there is no Fatherland;" and he would mistrust the man who hides his lack of patriotism under the name of being cosmopolitan. The influence of this upon Jahn bore fruit in the little book "Upon the Advancement of Patriotism," referred to above. This essay was simple in style and majestic in its patriotism. He extolled the glories of Prussia, the proverbial pride of its citizens, the valor of its heroes and the benefactions of its rulers. "With the exception of North America, there is perhaps no land on earth whither the unfortunate and persecuted sooner flee than to Prussia." He plead for the study of the history of the Fatherland, and deplored the empty lecture rooms of those who were bold enough to give courses upon this subject. "The scattered seeds are choked by the poisonous weeds of theological speculation and philological *Spitzfindigkeit*. The altars of the muses of German history are destroyed. In their temples are nested the unholy progeny of the school-monarch's perverted brain; for foreign modes of reading and the painful grammatical rules of the ancient languages are the idols that the rectors worship."

The other event referred to was what led to his expulsion from Greifswald. A continued quarrel with a student faction led by a rival was finally appealed to the academic authorities; and in the trial it appeared that Jahn was the author of an *Oratio archæologica sacroburschicosa pro gradu doctoris quomodonis*, which had been delivered by another member of the university at a student gathering. This oration was written in the form of a parody upon the Bible and contained all the accumulated smut and obscenity of many years of student life. It was so thoroughly bad that Euler says he cannot quote a single passage to illustrate its character.

Next Jahn became a private teacher in Mecklenburg. Here he was successful, worked diligently, and published his work on the High German vocabulary. He had the prospect of becoming a university teacher, but in 1806, in the dark hours of Germany's misfortune, he was filled with hate of Napoleon and the French, and took an active part in the efforts of the German patriots. He published his work, *Bereicherung des Hochdeutschen Sprachschatzes im Gebiethe der Sinnverwandtschaft, ein Nachtrag zu Adelung's und eine Nachlese zu Eberhard's Wörterbuch*. In 1809 he went to Berlin, and became a teacher in the *Gymnasium* of the Gray Cloister, and in Dr. Plamann's educational institution, which was conducted in the Pestalozzian spirit. His *Deutsches Volksthum*, although first written several years before, was not published until 1810. This book was written in the spirit of Fichte's famous *Reden*; it con-

tained much upon education ; it was full of patriotism, a prophecy of German unity. In the same year, with Friesen, Harnisch and others, he founded the *German Union*, an organization pledged to free the Fatherland ; and he drew up the plan for the German *Burschenschaft*, a universal student society that should unite all the universities in defense of the country.

In 1811 he opened the first gymnastic ground in the *Hasenheide*, just outside of Berlin. Here he strove to educate the boys to be avengers of Germany's disgrace and the emancipators of the Fatherland ; and as soon as the war of independence broke out Jahn and his Turners were the first to enlist. After the war the importance of gymnastics was recognized. On returning to Berlin in 1814, Jahn undertook again the direction of gymnastics with the support of the state ; and he established the Berlin society for the advancement of the German language. Gymnasia were established throughout Germany. But later the Turners were suspected of being Liberals. Jahn himself was arrested, the gymnastic grounds were closed. In 1825 he was released, and found an asylum in Freiburg. Here he wrote some minor works. In 1848 he became a member of the Frankfurt National Assembly. His gymnastic activity, however, ended with the year 1819, but he lived to see the revival of physical training due to the efforts of Spiess. He was held in the highest honor by the German gymnasts ; they restored his property to him, and after his death in 1852 erected a monument to his memory. His one aim throughout life was to make Germany united, great and strong. This was his dream and his inspiration ; and the aim of his writings was patriotic rather than pedagogical.

The direct aim of Jahn's gymnastics was to make the bodies of the Germans strong against the French ; but, while primarily military, the pedagogical aim was not entirely forgotten. He demanded that gymnastics should restore to human culture the proper equilibrium between the mental and physical. His *Deutsche Turnkunst* appeared in 1816. It had been awaited with great expectations, was favorably received, and had a great influence. It was not very systematic, but it contained a large collection of exercises both new and old. It treated of gymnastic terminology, apparatus, clothing, laws, gymnastic plays, the qualifications of the gymnastic teacher, etc.

Jahn placed special emphasis on the importance of a gymnastic vocabulary. Language culture and the invention of exercises and apparatus, says Lange, went hand in hand with Jahn. German things should be called by German names. The word *turnen* was not originally a German word, but it became thoroughly naturalized, and a great many derivations were formed from it, such as *mitturnen*, *vorturnen*, *Turnkunst*, *Turnplatz*, *Turnzeit*, *Turntracht*, etc. He enriched the German language by bringing obsolete words back into use, by forming new words by analogy, and so on. For example, from *anfussen*, to get one's feet on, to alight, were formed *anhanden*, *anferfen*, *anschultern*, etc.

Jahn places a very high estimate on the work of the teacher of gymnastics, and is very eloquent in speaking of his responsibility. The director of a gymnasium undertakes a great obligation. He has to care for the youth's development and that he does not injure himself by immature exertions. He stands in the most intimate relations to his pupils. To him the youth makes no secret of his thoughts, feelings, wishes, passions and dreams. Whoever is not filled with the spirit of childhood and of patriotism should keep away from this "sacred work." The teacher of gymnastics has the most difficult position of all the teachers of youth. In the case of

other teachers the work rests on knowledge; the work of the gymnastic teacher is inseparable from knowing and doing. Other teachers always remain in advance of the majority of their pupils, but the boys can often surpass their gymnastic teacher; hence the latter must strive above all things to acquire and retain as much gymnastic skill as possible. He must never present to the young gymnasts a ludicrous or awkward example. If he cannot acquire certain kinds of gymnastic skill, he must, nevertheless, become acquainted with all parts of gymnastics, and acquire the gymnastic spirit. The following are the necessary qualifications for the gymnastic teacher: (1) He must set no bad example either in or outside the gymnastic grounds. (2) During the period for gymnastic exercise he must refrain from things that are not proper for the youth, smoking for example. (3) He must always be courteous. (4) He must always be punctual. (5) He must not except himself from the rules, but be the strictest judge against himself. (6) He must himself exercise quietly and modestly. (7) He must so lead the conversation of the youth that it will be instructive and entertaining and without offense. (8) He must avoid deceit and schoolstiffness, and be friendly in his behavior and dignified. (9) He must be inspired with the importance of his subject, not be influenced by self-seeking and vanity. (10) He must be able to conduct himself in such a way with his pupils that they will love and respect him as a man. (11) He must find out the hidden peculiarities of his pupils, and foster nascent virtues. (12) He must be the friend, director, judge, adviser and monitor of the gymnastic pupils.

It is said that Jahn himself, at least in the first years of his activity, almost embodied these rules. The order that prevailed on his *Turnplatz* was wonderful. One writer says that one who had not been an eye-witness of the exercises would hardly believe that, among four or five hundred boys in constant rivalry, there was no outbreak of passion, that no harsh words were heard, but that everything was quiet and peaceable. Jahn watched over all. His calm earnestness, his affection, his thoughtful intellect, his physical strength and skill, had created an invisible bond of union between himself and his pupils. Small and great were attached to him and respected him. His utterances were "golden words from the mouth of Father Jahn." He exemplified the motto *Frisch, fromm, fröhlich, frei.*

Jahn's *Turnkunst* has received the highest praise. Nothing of the kind of equal excellence has been written since Luther, says the lexicographer Passow. In the opinion of Harnisch, it is a classic work. Von Raumer praises it as thoroughly German; and Lange, the author of the History of Materialism, numbers the preface to the book among the classic German writings, and says that every cultivated German, whether a gymnast or not, must become acquainted with Jahn's writings.

To Jahn's influence was due the introduction of heavy gymnastics into Germany. Exercise with apparatus became so prominent that the old popular exercises, running, jumping, climbing and the like, dropped more and more into the background, although this result was not intended by Jahn. The Greek simplicity in gymnastics, made prominent by Guts Muths, disappeared in Jahn's school. Guts Muths distinguished between gymnastics and the art of Turning. The latter was military, the former educational. Jahn's art was primarily military, and the pedagogical aim fell into the background. Hence the gymnastics of Guts Muths is more universal and could be transplanted to other countries. It is unnecessary,

however, to attempt a division of honors between these two men; but together their influence brought about the great revival in gymnastics in the first years of this century; and they are rightly called the founders of German gymnastics.

The essential characteristic of Jahn's art of Turning was its intimate connection with the national idea. It was thoroughly German in character. The physical exercises of the system might be transferred to another country, but not the Jahn art of Turning. It developed freely, independent of any school or educational institution, and free from limitations of rank or age. The bond of union was the dominant idea of saving the Fatherland. This gave the sports and exercises their military character, but the training was not formally military. Jahn used the contributions of Guts Muths and Vieth; but he did not understand Pestalozzi and would know nothing about him. The dislike of the two men was mutual. The immediate end that Jahn had in view—the saving of the nation—was attained earlier than was expected. Then it became necessary to turn his art into the channels of educational gymnastics. Jahn was not fitted for this work; and his pupils Eiselen and Massmann, great as was the work they did, were not free from prejudices. But afterward came Spiess, and he was fitted for the new work.

Adolf Spiess was born in 1810. Brought up in an institution founded upon Pestalozzian principles and conducted in the Pestalozzian spirit, in which physical exercises were conducted according to the methods of Guts Muths and Jahn, himself a skillful and enthusiastic gymnast, he was permitted to devote rich knowledge and skill as a teacher to the service of gymnastics. A new era in gymnastics dates from the publication of the first volume of his *Lehre der Turnkunst* in 1840. This work, however, was not a text-book. It was an attempt to bring together and systematize all that had been contributed to the subject of gymnastics. Although abstract, dry, indigestible and unpopular, the book had great influence, and its author is deemed the founder of school gymnastics. He brought free gymnastics and exercises for girls into prominence.

His great service was that he differentiated between gymnastics for adults and gymnastics for youth. The former he would leave to the Turnvereine, the latter was the work of the school. This differentiation of gymnastic instruction is what especially distinguishes his gymnastics from that of Jahn. In Jahn's Turnplatz everybody, old and young, exercised at the same time. They were separated into groups merely according to age and the time they had been in the course. Spiess made gymnastics a regular school subject, under supervision like any other subject. With Jahn gymnastic exercise was entirely optional; with Spiess it was obligatory. Jahn's exercises were conducted in summer and out of doors. Spiess demanded that gymnastics should be practiced independently of the season of the year, and that suitable gymnasia should be built for the purpose. Jahn took his pupils to the Turnplatz on the free afternoons. Spiess had the hours for gymnastics at other times in connection with the regular school work. Jahn had his best pupils act as Vorturner and give instruction to small groups. Spiess made the regular school classes constitute the classes in gymnastics; and each had its regular allotted task as in the instruction in other subjects. Jahn's teachers came from different callings in life; Spiess demanded the teachers of gymnastics be pedagogically trained and capable of giving instruction in other subjects. There was great difference, too, between these two men in the content of their instruction. Jahn's exercises were the result of empirical study. Spiess reorganized the material of instruction from the point of

view of the body's power of movement; and with his free and order-movements he opened a new field in gymnastics and laid the foundation of gymnastics for girls. Spiess, however, sought to retain the spirit of Jahn's Turning with its freshness and enthusiasm.

In 1842, by a cabinet order of King Frederick William IV. of Prussia, physical exercise was recognized as an indispensable part of education; and prominent among those who, by their writings, seconded this order were Diesterweg and the philosopher Trendelenburg. Since that time this branch of education has been furthered by a series of enactments, culminating in the order resulting from the School Conference of 1890, which makes provision for daily physical exercise in the secondary schools. The excellence of gymnastic instruction in Prussia has been due largely to the influence of the Royal Institute for Teachers of Gymnastics in Berlin. In other German provinces also, and in Austria, physical culture is deemed an important part of education. Among the many writers of to-day who are worthy successors of Jahn, Guts Muths and Spiess, are Angerstein, Bach, Ecker, Eitner, Lion, Lukas, Wassmannsdorff, and Euler, the author of the excellent history before us.

Contemporary with the renewed interest in physical training in Germany due to Guts Muths and Jahn was the revival in physical culture in Sweden in the early part of this century, which resulted from the teachings of Pehr Henrik Ling. Like Jahn, Ling was a wanderer in early life. After leaving the gymnasium he traveled in Denmark, Germany, France and England. In Copenhagen he learned fencing, and undoubtedly he was influenced by Nachtigall. After returning to Sweden he became a teacher of gymnastics at Lund as early as 1805. A lecturer upon Norse mythology, history and poetry, a teacher of modern languages, afterwards a national poet and member of the Swedish Academy, he brought unusual ability to the task that he had set before himself of becoming a teacher of culture to the people. He was instrumental in establishing the Central Gymnastic Institute in Stockholm in 1813, a state institution, at the head of which he was placed. In his *Gymnastikens allmänna grunder*, of which the first volume appeared in 1834, he gives the principles upon which the Swedish system of educational gymnastics is based. In this he presents not only the laws of the human organism and the methods of gymnastics, but also gives the outlines of pedagogical, military, medical and æsthetic gymnastics. In the part upon pedagogical gymnastics he presents those principles of simplicity, discipline and coördination of movements in relation to the whole organism that have been elaborated by his numerous followers. He considered the human organism, mind and body, an indivisible unit; and, like the Greeks, he aimed at complete development of the whole man. For this end he chose a method of many-sided physical development, based on an anthropological, anatomical, physiological and psychological knowledge of human nature; and he sought to strengthen character by developing the physical strength, while at the same time counter-balancing the evil effects of undue intellectual culture. Thus by a series of exercises in regular and organic sequence, beginning with the simple and advancing little by little to the more complex and more difficult, the pupil would become master of his own body; the will having perfect control over the muscles and the reason over the will.[1]

In Germany, the Ling system was advocated by an ardent disciple, Hugo Rothstein. In 1844, after two visits to Sweden, he

[1] See quotations from Rothstein, Euler, op. cit. pp. 275, 276.

wrote an essay upon Ling and his gymnastics, which attracted the attention of the King; and afterwards he expounded the system in a voluminous work. But owing, perhaps, to the bitterness with which he denounced German Turning, which he characterized as a chaos of conflicting ideals and as physical sophistry, the Ling-Rothstein system found comparatively little favor in Germany. Alexander Von Humbolt criticises Ling's anatomy and physiology as "barbarously crude." Du Bois-Reymond declares that "only a half educated person, to whom arbitrary construction, a hollow symbolism, dry schematism, a pedantic terminology, and a few anatomical, physiological crumbs appear to be deep science, will let himself be imposed upon by it;" and Rothstein's presentation of the system is criticised still more severely.

The battle that was fought in Germany between the followers of Spiess and Rothstein thirty years ago is the same battle that is being fought in America to-day; and Euler's comparison of the Ling system as represented by the latter with the German system as represented by the former is instructive. It is in substance as follows:

In many respects Spiess and Rothstein had a good opinion of each other; but the starting points of their systems are completely different and thoroughly opposed. Spiess starts with the possibility of movement; Rothstein, with the purpose of movement. According to the latter, not all possible movements should be practiced, but only those to which some definite, rational purpose,—anatomical, physiological, practical, pedagogical or æsthetic—can be assigned. The consideration of the utility of gymnastic exercise takes the place of the unrestrained pleasure in movement as such. The fresh delight in the form of gymnastics with Spiess is opposed to the prevailing idea of simplicity in the Ling-Rothstein system. The two views carried to an extreme may be contrasted as follows: The system of Spiess, in its extreme form, demands too much of a pupil; that of Rothstein, too little. Spiess develops the motor impulse without limit; Rothstein limits it even with one-sided severity. Spiess puts his limits too wide; Rothstein, too narrow. With Spiess there is danger of trifling and mere play; with Rothstein of deterring severity. Spiess generalizes to superficiality; Rothstein concentrates to the point of ennui. Spiess emphasizes the practical side too little; Rothstein, too much. Spiess, from mere activity, falls short of thinking and testing; Rothstein, from his desire to consider and test, fails of fresh activity. Spiess builds a structure out of an enormous amount of material, with beautiful, many-colored stones, and with rich ornaments; but the building is too large; one is confused and lost in it; many useless stones also are built into its walls. Rothstein builds only with solid stone; but material is lacking; instead of a house he builds a hut, too small for anybody. In a moderate application of both systems are to be found all the conditions of a truly rational school gymnastics resting upon a healthy foundation.[1]

WM. H. BURNHAM.

VII.—MISCELLANEOUS.

Essays and Studies. By B. L. GILDERSLEEVE. 1890, pp. 512.

Professor Gildersleeve's 12 papers published during the last quarter of a century are printed in an edition of 600 copies. The first four, comprising the first 160 pages, are on educational subjects. The first of these is entitled *Limits of Culture*, and under the form of a criticism of a book of which little is said, contains the author's

[1] Euler, op. cit. p. 339.

views on classical education. His position may be very roughly sketched by the following catch-phrases: We want not less Latin and Greek, but less waste of time in learning them. Teachers must know them better, and force the pupil out of humdrum text-books to bathe in as well as drink classical knowledge. Authors must not be read who would be worthless if not written in Latin. Something might be omitted even from "that Turveydrop of Latin style, Marcus Tullius Chickpea." Quality may be caught by ear. Even during English revivals of Greek, the character of the controversy has declined. For the genius there is no education save that which he gives himself, and that often destroys his school training. Faraday said he was not an educated man according to the usual phraseology. While education should form rather than inform, it is not enough to consider the sacred tripods as dumb-bells, to develop mental triceps. As the Spartans discouraged all gymnastics that did not tend to military efficiency, so we discourage all studies that do not prepare for the work of life. Instead of cultivating the larger faculties, we seek to raise ourselves a step or two on the social ladder. We cannot afford to lose the record of very great deeds or utterances which provoke to sympathetic greatness across two thousand years, and cultivate the one true fruit of life, purity of heart and work for the good of society. These languages fitted thought as tight to its skin, and revealed its form and motion more than our careless gush of diction. The old mines are not exhausted. Much of the last results of thought is but the last result of modern plagiarism. Antiquity was rich in the wisdom of life, knowledge of human nature favored by greater simplicity of life. Quintillion is a repertory of the best thoughts of antiquity in education. Annihilate the classics and the modern world would be like the unsouled bodies of Jean Paul's dream when God was dead. Our poets' and historians' pages would be blurred and scentless. General grammar is best learned in the more exact and varied classical tongues. English grammars abound most in America. The freedom of arranging the parts of a sentence is a peculiar charm of later Latin and Greek. The sentence grew with the mind, and these languages may be called transpositive, and language has lost by shutting itself up to a rigid sequence of subject and predicate. This ancient freedom gave a peculiar discipline. The scattered parts must be combined into a living symmetry and organic unity. These parts must not be taken in after a mechanical scheme and the moods redistributed in an English sentence. Latin and Greek must be read in their written order. To thus think in Latin and Greek, the ear as well as eye must be trained. Instead of slowly putting the elements together like pieces of dissected map, the mind must be trained to catch, carry and combine the far sundered members of a Platonic sentence in a clear and exact way at a single reading. This is a mental culture of very high order. The best way of learning a language is by a direct strain upon the memory. Grammars are products of the same sort of induction as sciences. Textual criticism, the laws of combination and sequence of letters, the shifting of accent, is inductive. Classics also teach to suspend judgment. It is an uncertain field like physiology and works by probabilities and not by yes and no. It is teaching, not study that breeds cock-sureness and destroys the power to hold conclusions proportionate to evidence. Utility that would break up statues to feed lime-kilns, and the concentration of educational interests in Washington, forgetful of the wonders wrought by Greek autonomy, and of the sad loss to culture by Roman unity, and of the cause of Rome's decay—these the author fears.

Classics and Colleges. From a mercantile point of view the vested interests in classics are vast. Teachers and publishers have a heavy stake, which is like the pecuniary hold of paganism in the early Christian centuries. Classics have studded our vocabulary and dug out our channels of thought and action, and are the accumulated mould of thought in which philosophy strikes root. The history of science is a grand fugue in which the voices of nations come in one by one. Without classics our noble tongue would become a jangle of false notes or a rattling vulgarity of slang. In Goethe's Märchen, the will-o'-wisps licked out the gold veins in the colossal figure of the composite king till it suddenly collapsed, as culture would do without classics. As well dispense with religion. Some scientists are beginning to fear that physical science may utterly break down. We get rid of the doubt of ourselves, the vague longing, the enthusiasm, the unselfish striving for truth and the quiet deep inner life. The days of the petty knights and princelets of Germany had their charm. Where physical science reigns exclusively the intellect becomes poor in ideas, the fancy in images, the soul in sensibility, and the result is a narrow, hard, dry disposition forsaken of the muses and graces. Considering the necessities of a new country, Americans are less in danger of Americanism than Germans are, and idealism here is increasing. We lack honest manly criticism. The actual contact of the average mind with classical life is less than it was 25 years ago. As Goethe had never thought about thinking, so this teacher never thought of teaching. Too much work in college kills mental mobility and brings on hard, dry professional habit of mind, that makes everything seem a problem. College disorders mean that the discipline is intolerable. The professor must persistently commune with sources and show the plastic forces of personal research. But the teacher must not expatiate solely on topics of personal interest to himself. New points must not be incorporated before they have had time to cool and shrink.

University Work in America and Classical Philosophy. The Greeks designated personal intercourse and higher study by the same name. A German house offers for sale 60,000 dissertations. Americans, despite their disadvantages, should excell in problems of ancient manners and politics. Active membership in a philological association should be a part of the required duty of professors (as it is at the Johns Hopkins University). Classical authors must be constantly re-edited and re-translated. The "æsthetics of syntax" is a new field fit for Americans, and grammar is the highest problem of science. Great professors are worth hearing for the "catalytic" effect. The seminary should develop power of presentation as well as of research, and textual exigesis should be as prominent as criticism. The director of a seminary should not consider denial of his principles as the mystic sin against the Holy Ghost. Nearly every Greek and Latin author of note is translated into French.

Grammar and Æsthetics. This paper is devoted to an apology for what might be called higher grammar. Dr. Johnson's style was marked by a prominence of the nouns, which have grown in prominence ever since, while the infinitive mood has declined. Syntax runs all the way from rhetoric to grammar. Those who recognize moral and æsthetic elements in the vowel registers and consonant ranges of authors are slightingly spoken of. Thucidides is ante- if not anti-grammatical. The rise of the parenthesis in Carlyle would be a good subject for study. Style is not always the man but may be designed and artificial and at length may become secondary automatic. Grammar arises after the decline of literature and came

to be thought to be regulative only lately. The two are as distinct as the laboratory and oratory of certain scholars. Grammar, while repulsive to the natural man, has strange fascination for the scholar.

A brief article on classical study describes a lecture by a great master. The subject was the vanishing of weak vowels in Latin. The tone in which this unpromising subject was announced was that of a man who had seen the elements melt with fervent heat. As he went on and marshalled facts in long line that connected the vanishing of a vowel with the downfall of a great nation, while great linguistic and moral laws marched along, the lost vowels seemed the lost soul of Rome. Life, language and history were clothed with a new meaning.

All the other essays on classical subjects are lively reading, but less pedagogical. He has now, perhaps, become too much of a philologist to be able to revise these earlier literary studies. They display a range of both general and special reading that is an honor to American scholarship. His tone is lively, rarely serious, and often cynical, and even flippant. The essay that seems most in the line of the author's further growth and work is that vaguest of all on Grammar and Æsthetics. This perhaps marks the point where all lines of the former literary interest converged and from which those of the present and future philologies diverge. Much as he abhors philosophy and despises pedagogy, he contributes something to both.

Die Sieben Freie Künste im Mittlealter. G. MEIER. Jahresbericht der Benediktiner Stiftes Maria-Kinsiedeln.

Rome and ancient culture had decayed, and a new church as a first renaissance and new people, appeared. All kinds of skill the Romans called arts and divided them into liberal and servile. In the fifth and sixth centuries the former began to be called seven, but it was the satyikon of Capalla, a heathen African advocate that embodied them in the traditional form of the trivium and quadrivium, and was a text-book for 1000 years. This book is written in alternate prose and poetry, in the most artificial style and crammed with belabored tropes, allegories and mythological allusions. Its content is as follows: Mercury contemplates marriage, and Apollo proposes Philology, who is of old stock and embodies all wisdom. Jupiter calls a council of the gods and holds a poetic oration, and the council decides to take earth-born Philology into their circle. In the second book the seven muses invite her to heaven. She had thought over all kind of number secrets during the night. She was now given heavenly beauty, lost all that was eartly and mortal. Books went from her mouth, some written on paper, some on parchment, and then Mother Apotheosis gave her the drink of immortality and she mounted a coach and was carried up to heaven. They pass by moon and the planets to the home of Homer, Plato, etc., when they dismount and Apollo introduces the seven virgins, whom Mercury had chosen as companions of his wife—the seven free arts. To each of these one of the seven following books is given. Grammar, *e. g.*, appears in the third book, old, but genial. Her knife cuts error from the tongues of children, and she carries a powerful medicine against mis-pronunciation. Her file removes solecisms. Dialectic appears in strange costume and coiffure, and with many definitions. Rhetoric describes her art and also prosody. Geometry describes the earth as round, motionless and central. Arithmetic, astronomy and music follow, medicine and architecture are omitted for want of time and the whole closes with a slumber song.

Boethius, Cassiodorius, Beda, followed in the wake of "Our Martian, the dark African." Alkuin called the seven arts the seven pillars of wisdom, or the seven branches of the tree of knowledge. His text books are in the form of question and answer. Maurus, in his great work on the education of the clergy, shows that the seven arts reach their highest function as introductions to study of theology. They gradually became the alpha and omega of culture. They were so many halting places of the soul on its way upward to its true home. They were the encyclopedia, the *orbis pictus* of medicinal knowledge. They are described in poetry as seven sources of philosophy. Painters gave each its typical form. They are seven supports of the Holy Word. When universities came they were united in one faculty of "artists," and master of arts was the only academic degree. Logic became central. Gradually other disciplines were added, and the old canon gradually desintegrated.

As commonly taught at their best the arts were as follows:

I. *Grammar.* Donatus, 355, A. D., wrote a larger and smaller grammar. He was gruff and his habits were so bad he was banished from the Roman Senate. Priscian was far more learned, and his grammar was used over 1000 years. Dictionaries were at first only meagre vocabularies, and Greek was little taught. These two authors were elaborately commented upon. Rather's grammar, 974, was called a "back-sparer," because it saved blows. Alex. Gallus, *Doctrinale puerorum*, circa 1200, was in 2454 verses, often ryhmed, and was prescribed for students of theology and law, and was often parodied. The revival of classical learning tended to better style than had been inbred by the grammars. The authors mostly used were the fables of Phadrus, the chrestomathy of Avianus, Virgil, Lucian, Horace, Ovid, Statius, Terence, Sallust, Suetonious, Ling, Cicero, Seneca, Tacitus, Cæsar. If the church objected to profane authors it was commonly said that the Israelites plundered the Egyptians. All came at last to be in logical style, and grammar became a speculative science. Such questions as why *sum, es, est*, did not end in o, whether *Legitur Vergilium* was correct, etc., were discussed, yet bombastic over-loading with words and trifles is perhaps a defect natural to growth.

II. *Dialectic* was the old term for Philosophy. Of Plato, only the first part of the Timæus was in Latin. Of Aristotle, four books of the Analytics, eight of the topics, and two of the sophistic elenchi. Duns Scotus and the school of Fulda aided this logical movement. Aristotle gradually overtopped Plato, and dialectic in the 13th century outranked even grammar and was supreme in the trivium. The career of this current of thought falls in the history of philosophy.

III. *Rhetoric* was the product of the practical Romans. Nearly 100 texts of the former, *Libes quatuor rhetoricorum ad Herennium*, are known mostly from the Carolingian time. Cicero's *De Oratore* was less known. Oratory changes rapidly with changing taste. Alkuin's Rhetoric was widely known. Letter-writing was part of the art, as the clergy must write them for the unlettered. These were of different fashions, Andegave, Lindenbrogian, Baluzian, etc. Long antique poems were written and poesy, and especially Latin verse, flourished. Latin school poetry had its golden age. Epigrams, anagrams, the strange fashion of splitting long Latin words, riddles and parodies, acrostics, new forms of meter, etc., abounded.

IV. *Arithmetic.* The quadrivium is mathematical. The traditions of pure mathematics come from the Greeks, those of applied from the Romans. The text-books were begun with notation. Fractions

were at first rarely treated. Fractions recurring went to one million. Numbers were full of mystic significance; number was the primal conception of God. The processes in the four species were very elaborate, especially division, which was a tedious system of subtractions. The higher arithmetic or *computus* was the calculation of Easter, which was fixed by the council of Nicea on the first Sunday after the first full moon following the vernal equinox. Of the various cycles the anglican "line" of 19 years was in wide use. Much was done by the text-books of Gerbert, later Pope Silvester (1003), who introduced a special sign for zero. A game called Rhitmomachia was popular, by which numbers were brought in certain relations the one to the others. Arabic figures brought a new era in the 13th century.

V. *Geometry.* This was the Roman art of measuring fields, and was at first very meagre. The angles, circles, etc., says Maurus, were the same as those used in building the Jewish temple. Gradually geometry increased, mostly from Arabic sources. Maps were known from old Roman sources.

VI. *Music.* Singing was everywhere taught and was part of every church service. From this only, of the quadrivium, no one could be excused. It was largely taught by ear and memory. Special schools of song were establised in 802, of which that of St. Galleus was famous. Hence came new notes or "neumer," also letters, e. g., c=celeriter, a=altius, etc. Slowly the staff, "solmization" on the designations do, re, me, etc., new accents, signs, etc., came in.

VII. *Astronomy* regulated the hours of prayer. Time measurements were harder than we can easily conceive. Astrological secrets were many and the heavenly bodies were depicted on tables, plates, shields and by means of many primitive pieces of apparatus. Maurus described the heavens as a fiery hemisphere. Wonderful were the orreries and symbolic distances and motions and polar spheres. The astrolabe was regarded as almost of divine origin, and in the 12th century eclipses began to be rightly predicted. The seven arts thus ended with the celestial science and led to theology the crown of all.

Protestant zeal has disparaged the middle ages, with the greatest initiatives known to history, in regarding it as a thousand year night of barbarism. We should not despise our youth.

Study of a Child's Book.[1]

A book which appeals to a large number of children through a long period of time must have in it something which reflects back to the children their own thoughts and feelings, and ways of looking at the world. Consequently, a collection of books that children love to read would give us the material for studying the world in which they live and feel and think.

The aim of this little study is to determine why Der Struwwelpeter has been received with such perennial favor by the children of the past two generations. For them it has been translated into English, Dutch, Swedish, Danish, Russian, French, Italian, Spanish and Portuguese. It reached its one hundredth German edition during the life of the first generation and has reached the one hundred and seventy-second edition during the middle life of the second generation.

The book is a quarto of some fifty pages, bound in boards and covered with orange colored paper, on which is stamped a scroll

[1] Der Struwwelpeter, oder Lustige Geschichten und drollige Bilder für Kinder von 3-6 Jahren, Von Heinrich Hoffmann—172 Auflage.

bearing the names of Slovenly Peter, Santa Claus, Bad Frederick, Suckthumb and the other characters pictured inside.

The gaily colored *title page* shows at the top the Christ-child with Struwwelpeter open in his hand, a Christmas tree on each side of him, and a shower of Christmas presents falling down upon the good children below. The centre piece of the page, round which these good children are ranged, is a verse enumerating the marks of a good child to whom the Christ-child brings this beautiful picture book. The occupations of the children illustrate these characteristic virtues of childhood. The Jubilee leaf is conspicuous, following the title page. At the top of the leaf are the dates of the first and the one hundredth editions, 1845-1876, gaily wreathed with roses. Below, as a centerpiece, is the address of Struwwelpeter on this his one-hundredth appearance before the children of Germany. A festive procession of the characters of the book moves round this centre piece, bearing a banner inscribed "Vivat Struwwelpeter." It is headed by the grave benign Santa Claus carrying an enormous bouquet labeled 100. The good children follow, bearing garlands and bouquets. Through their Christmas drums, horns and whirligigs they pour out their Christmas joy and their welcome to Struwwelpeter.

On the first page following, stands, on a pedestal, Struwwelpeter himself in an orange colored frock, with the wildly extended hair of an Albino, and with nails much longer than his fingers. Below on the pedestal are figured the comb and the scissors which, the inscription informs us, Struwwelpeter has not allowed to touch him for nearly a year.

Then comes the stories, told in verse, illustrated with a profusion of highly colored pictures. The first is the story of Bad Frederick; a series of pictures illustrates his cruelty to the bird, the cat, the chickens, his nurse, and last of all the dog, who revenges himself by biting Frederick and carrying off his whip. While Frederick lies in bed and swallows bitter doses, under the eye of a gracious old doctor in a blue coat, the dog sits down in the dining room in Frederick's chair, eating Frederick's sausage, keeping carefully by him all the while the whip.

Next meddlesome Pauline, in spite of the earnest remonstrances of her cats Minz and Maunz, insists on playing with matches, sets eerself on fire to the utter distraction of the cats, and burns to a small heap of cinders blackly steaming, extinguished, except one small glowing coal, by the torrents of tears pouring from the eyes of the two cats who weep on each side, clad, as to their tails, in voluminous bows of crape.

The most delightful tale of all follows. Ludwig, Kaspar and Wilhelm, for reviling an unfortunate Black-a-moor who walks in the shade of his umbrella, are dipped by the grave old Nicholas into an enormous ink well, pretzel, hoop, flag and all. Out they come "blacker than a coal black robin."

Suckthumb, who puts his finger into his mouth as soon as his mother leaves the room, is caught in the act by the tailor, who snips off both thumbs.

Fat Kaspar refuses to eat his soup. He passes through daily stages of ever increasing attenuation, and on the *fifth day* lies beneath a green grave under a monumental soup bowl, a cross at his head, roses blooming at his feet.

Philip the wriggler and twister, regardless of his papa's stern command and his mamma's silent menace, by his contortions at the table overturns his chair, and, in his eagerness to save the back of his head, clutches the table cloth and is buried beneath the ruins

of the dinner. His father leaps up, gazing in consternation at the empty table, and mamma, through her glasses, searches for the vanished Philip. The tail piece of this picture has changed from the bottles and fruits of the preceding scenes (of the table) to pendent birch-rods. The misfortunes of "Hans' Look in the Air," are seen to reach a climax in the pond much to the dismay and subsequent amusement of the Fischlein therein. Flying Robert, who would not stay inside when the storm was on, as the good children did, is blown up into the sky with his umbrella far above the cloud from which the rain is falling.

These are the characters who figure in this little book, and such are their experiences. The characters are those who people the child's own world. First Santa Claus, the dearest of all characters to the child, and the dirty boy—that is himself. Father and mother are a matter of course implied in the words good and bad. They are most characteristically pictured in the table scene. His own experiences follow, enacted by the cruel boy, the prying girl, the boy who will not eat his simple food, who will not sit still, who will go out in the rain.

These illustrate his own shortcomings in the matter of the daily toilet, table manners, and, above all, in the child's chief duty, obedience. There is no moralizing to offend him, but a simple narration of the story. The punishments follow in most cases as the natural effects of the misdeeds; in others they are inflicted as a just punishment by rightful authority. They always follow "as the night the day." This satisfies the sense of justice, which is strong in the child and does not dull his enjoyment of the situation, since the punishment is not inflicted on himself. These are the penalties so often held over his own head, but which he has never before seen incarnate.

The imagination is not left without its share in the entertainment, as seen in the adventures of the Wild Hunter; and in Santa Claus, who is a link between the seen and the unseen world. These stories are told in simple jingling rhyme, that runs on without a fault in the meter, and this is one cause of their success. All who have studied young children must have observed their love of rhythmical movements. So, too, the repetition which delights children is recognized in the Struwwelpeter in the refrains, as in the story of Meddlesome Pauline. This refrain, with the change of a word or two, is repeated after each verse:

Und Minz und Manz die Katzen,
Erheben ihre Tatzen
Sie drohen mit den Pfoten:
"Der Vater hat's verboten!
Miaou! mio! Miaou! mio!
Lass stehen! Sonst brennst du lichterloh!"

Added to the charms of rhyme and rhythm and repetition is the fact that all the stories are told in the child's own words.

The pictures are all in outline, without any attempt at perspective. They resemble the spontaneous drawings of the children themselves and are perfectly understood by them. One sees what is going on upstairs and downstairs all at the same time, and when Hans Look in the Air tumbles into the stream, one sees the fishes swimming around him as in an old Egyptian drawing, or one made by a child to-day. The time limitation under which art labors is overcome here, as in all pictures made by children, by a series of representations. Frederick is killing the bird, whipping his nurse, kicking the dog and getting his retribution in a series of representations blending one into another, but in a way perfectly

true to a child sense of picture language. The colors used are few in number and are typical hues, no shades nor tints being used. Each color marks an object as a unit, that is, it is used to mark out one object, and is not used in that picture to color conspicuously anything else. Thus each color has an individuality of its own and is recognized with pleasure as it appears in the successive pictures; for example, the green in Wilhelm's trousers in each of the several pictures which relate the story of the Black-a-moor, or theconstant orange of Santa Claus' great gown.

These simple outlines, colored in blocks of typical hues, tell the story to the eye as does the rhyme to the ear; and so clearly do they tell it that English speaking children read the stories almost as well from this German edition as from an English edition. Indeed the children studied in the preparation for this paper enjoyed the German book much more than the American edition used.[1] The drawings in the latter did not tell the story clearly and in some cases not truly, a fault most strongly condemned by children.

On the pictures of the cruel Frederick for example, there is no blending of the parts of the story. Frederick, in the first of the series, stands on an isolated section of a vine that has no connection, either logical or visual, with the other parts of the picture Below his perch lies the cat which he threw "*downstairs.*" The "birds he killed" are not shown, excepting one which is pecking mildly at the vine. There is no reason why he should be afraid of the foolish, harmless boy on the perch beside himself—there is no expression of malice, no gloating over the havoc he has made as in the German edition, and so with the doctor's visit, the true element does not appear. Nothing shows that *while* Fred takes from the doctor bitter medicine *upstairs*, the dog *downstairs* sits in the dining room and eats Fred's dinner. These are given as two detached scenes.

The colors are used often in a meaningless way. In one picture the dog is pink, in another he is white. The cat, too, is pink. The canary has a red body, yellow wings and a white head. In the Black-a-moor story, the Black-a-moor is not black, and Santa Claus is a lean old misogynist, with a big green ink bottle.

These false expressions seem sufficient to account for the fact that the American edition of Slovenly Peter is so little known.

We find, then, in this analysis a scientific reason for the favor shown this book.

It deals only with characters found in the child's own world, with his own experiences and fancies, and uses only his own equipment in expression. The relations of time and space and of person are shown as he expresses them himself. The book is his own.

How came it to be so entirely a child's book? In scientific phrase it is a case of "adaptation of means to an end;" of "response to stimulus." The author, in his preface, points out this "end" and the "stimulus."

He says that at Christmas in 1844 he could find in the stores no gift book for his own children, but those filled with tiresome moralizings as: "The good child obeys," etc.; so he bought a book with blank pages and filled it with stories and pictures that he had used in his necessity to reach the children whom he was called to visit professionally. He had found these stories and these pictures to work like a charm on the shrieking, retreating children, to whom the doctor as "the skeleton at the feast" had been held up as one

[1] Slovenly Peter; or Cheerful Stories and Funny Pictures for Good Little Folks. From the twenty-third edition of the celebrated German work of Dr. Henry Hoffmann. Porter and Coates, Phil.

who would give them bitter doses and who, perhaps, might bleed them. He would, with pencil and paper, so dramatically illustrate the moving tale, with which he quieted and charmed the child, that all else would be forgotten and the dreaded doctor became a most fascinating, enchanting sort of magician, who, with his pencil, could conjure up a most delightful world.

His own children were delighted with the new book. Their playmates wanted one. He had a small edition published. This led to other and larger editions, till now the book is published in nine different languages and has reached, as we have seen, its 172d edition in its 45th year.

When some parents have complained that the stories were absurd and that the pictures would injure the æsthetic sense of the child, Dr. Hoffmann has replied that, to the child, the stories were not absurd; that in his world fact and fancy are strangely blended and both are alike wonderful to him. That one must go where the child lives if he would speak with him.

To charges against the pictures, he replies that when they take their children to the art galleries to cultivate their æsthetic sense by contemplation of the master productions of genius, they will still find him taking more delight in his own creation made of two circles and four straight lines than in the Laocoön. He closes with this significant remark, "Das kind erfässt und begreift nur was es sieht," which recalls a long line of similar sayings, reaching back to Aristotle's "Nihill est in intellectü," etc.

While this simple study touches but a few of many interesting characteristics of this unique book for children from three to six years, enough has been found to show that there is a scientific cause for the universal and perennial favor which it receives from them.

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Adenoid Vegetations in the Naso-Pharyngeal Cavity; their pathology, diagnosis and treatment. W. Meyer, Copenhagen. Trans. Medico-chir. Soc. Vol. LIII. London, 1870.

Adenoid Vegetations. F. H. Hooper, Boston Med. and Surg. Journal, Mar. 4, 1886, and Mar. 15, 1888; and Med. and Surg. Reports City Hospital, Boston, 1889.

Über die Bedentung behinderter Nasenatmung, insbesondere bei schulkeindern. M. Bresgen. Zeitschrift für schulgesundheitspflege, 1889, No. 10.

Examination of the throat and nose of two thousand children to determine the frequency of certain abnormal conditions. W. F. Chappell, Am. Jour. Med. Sciences, Philo., 1889.

Schuluntersuchungen des Kindlichen Nasen und Rachenraumes an 2238 Kindern mit besonden Berücksichitigung der *Tonsilla pharyngea* und der *aprosexia nasalis*. R. Kafemann, Danzig, 1890.

Adenoids in the Naso-Pharynx in Children. T. H. Halsted, Med. Record, N. Y., Aug. 13, 1892.

In 1868 Meyer had a patient whose pronunciation was "dead;" common and sing were called "cobbod" and "sig." The patient's faucial tonsils were excised and the nose treated, but with no good results. Further examination discovered a mass of abnormal outgrowths of the lymphatic tissue in the naso-pharynx; removal of these brought speedy improvement. Meyer followed the clue, and in a little over a year treated 102 cases and examined 2000 school children, one per cent. of whom were affected with adenoids. The

paper is a classic; it leaves little for others to say save as to treatment.

Hooper's first paper gives the history, symptoms and treatment of adenoids. His second pertains to treatment and mechanical effects of the trouble; his third is given to the mechanical effects, and is illustrated with cuts showing abnormal chest and palate growths, due to faulty breathing. Guye asserts he has no doubt that the backward pupil, either day and night, or at all events by night, breathes with open mouth. He coined the word aprosexia to denote "the inability as a consequence of nasal disturbance to concentrate attention upon a given object."[1] As early as 1884 Bresgen brought the matter of the importance of free nasal breathing to the attention of the Prussian minister of education and asked that a chair for the study of nose and throat diseases be founded. No action was taken, but Bresgen continued his efforts. The article cited in an address given before a society of German naturalists and physicians, and in addition to many biblisgraphical notes, contains a full account of a most gratifying case of recovery of mental vigor. It demands that dull children shall be examined with special reference to the pharynx before they are sent to schools for dullards, and that the minister of education shall require teachers to examine backward pupils and report results of their investigations to the parents.

Chappell and Kafemann undertook to find how common the disease is among children. The former tested children ranging in age from four to sixteen years—916 from the New York Juvenile Asylum, 645 from grammar school No. 49, 200 from the Half Orphan Asylum and others from various sources. Sixty cases of adenoids were found (3.8% boys, 1.4% girls); two hundred and seventy of enlarged tonsils; and nine hundred and one other cases of abnormal development within the nose. Thirty-six of Kafemann's children were feeble-minded; the remainder were from the people's schools. Of adenoids, Kafemann found, boys 7.8%, girls 10.6%. The percentage is large, but this, it is claimed, is due to better diagnosis and appreciation of the danger of the trouble. Five hundred and ninety-two additional cases among the boys, and one hundred and seventeen among the girls, of slight adenoid growths were found. In connection with *hypertous* was usually found granulation of mucus membrane of the throat. Among the boys were found four hundred such cases, seventy-eight of which were excessive, the granules ranging in size from a half-pea to a half-bean. But one hundred and ninety-two girls were thus affected. Most of the cases of granulation were in children of eight or nine years. Dr. Halsted's examinations were of one hundred and fourteen feeble-minded children, and of one hundred and fifty-four orphans—all from asylums. Of the former 20.1%, of the latter 26% were affected with adenoids. Of the total number, sixty-three (23.7%) were adenoid; associated with enlarged tonsils were thirty-two (50%); and with some interior nasal obstruction, twenty-nine (46%).

Two of the most common effects of a cold in the head are hindered nasal breathing, and a "stuffy" feeling which in a measure unfits one for mental work. Because such effects are so frequent with adults, who are commonly able to trace them to imprudent exposure, their presence in children has been considered an unavoidable incident, of no serious moment. Yet cases of permanent injury, results of "a cold," are by no means rare in children. The walls of the child-pharynx are well supplied with lymphatic tissue, es-

[1]Quoted in Bresgen, loc. cit.

pecially so in the faucial tonsils, and in the third or pharyngeal tonsil, situated on the upper-back wall. A circle of lymph tissue, connecting these three tonsils, passes over the inner ends of the Eustachian tubes. In 1860, Czermak found two small "adenoids," or hypertrophic states of the pharyngeal tonsil, but attached no importance to his discovery. In succeeding years otologists began to trace relations between the presence of adenoids and diseases of the middle ear; but it was not until 1870 that their relation to mental inability was definitely pointed out.

Hypertrophy of the pharyngeal tonsil is in children a common result of "catching cold;" doubtless it is more easily induced through inherited scrofulous tendencies and is often congenital. Hooper (Med. and Surg. Rep. p. 62) treated a babe eight months of age. From three to ten is the period in which the growths most often develop, though they may occur in middle life. For the symptoms Meyer formulated the rule, "a deaf patient who breathes through the mouth and has a thin, compressed nose, is affected with vegetations in the naso-pharyngeal cavity." A very simple and effective test is found in the use of the vaseline spray. "When (this) is introduced into a healthy nostril, a cloud immediately issues from the other nostril; if the pharynx is occluded by adenoids, the spray does not return."[1]

In extreme adenoid cases, the posterior nares are completely covered and nasal breathing prevented. The results are many. Mouth-breathing is abnormal, and when persisted in causes throat ailments. Respiration is incomplete and entails, not only non-oxidation of the blood, but incomplete development of the chest. The upper facial bones need air in their sinuses, and in default of it, cease to develop normally. Owing to obstruction of the Eustachian tubes, the middle ear lacks aeration; engorgement of the inter-cranial lymphatics crowds the brain and cranial nerves and impairs the power of attention.

Articulation, so dependent on pharyngeal and nasal resonance, is rendered imperfect, and with defective hearing forms a great barrier to mental progress. When nasal breathing is cut off in early life, the atmospheric pressure in the mouth, meeting no opposition from the nasal chambers, pushes the palate up into a V-shaped arch and causes great irregularity in the growth of the teeth.

The result of removal of these adenoid growths is often most startling. Numerous cases are recorded of children, considered dull, or even feeble-minded, who, after treatment have immediately begun to manifest marked mental power. The change is variously ascribed to bettered hearing, articulation, easement of brain and consequent feeling of relief, but it is probably due yet more to improvement in general bodily condition.

FRANK DREW.

Oxford: Its Life and Schools. STEADMAN, pp. 300.

The universities owed their existence to the church, stood outside of it, not always friendly—the mainstay of orthodoxy—the haunts of heresy. Oxford, Paris and Prague reached their highest level of influence when swayed by the heretics, Wycliffe, Gerson and Huss respectively. Somewhat similar was their relation to the temporal power. They, with the municipal corporations, the monastic orders and the civil leagues, were the great forces hostile to feudalism.

[1] N. Y. Med. Journal, Nov. 26, 1892.

Oxford, not so old as Bologna, not so cosmopolitan as Paris, may claim to be more truly national than either.

Thus it took part in all great questions pertaining to the empire till from the loss of its liberties it sank from 1432 onward into a high class school, and not till recent times have efforts been made to give it its national character.

In Elizabeth's reign came the imposition of the thirty-nine articles and the royal supremacy, subscription to which was required from every student over sixteen, and Oxford, once open to all christendom, was narrowed to an exclusively church institution and became the favorite arena of the Anglican controversy—developing more and more that special character—worldly and clerical, which it with Cambridge shares alone among the universities of Europe. The eighteenth century was inglorious. The Wesleyan movement redeems it a little. The Wesleys and Whitfield were all Oxford men.

The nineteenth century witnesses many changes, mostly beneficial. Owing to the rise of other colleges Oxford can never regain its great national influence. The spirit which lit the flames of Grostete, Wycliffe, More and Wesley will ever remain to Oxford its rich inheritance.

All students reside, and they should not enter before eighteen years old. A boy with mind and character undeveloped has nothing to gain and everything to lose from contact with the labors and temptations of an Oxford career. As schools of learning the colleges are excellent, and as schools of manners they are equally preeminent. The ideal object of an Oxford career is to imbue the student with the highest form of culture, to teach him the best that has been thought and written by the best minds on the highest subjects, and to enable him to play the best part in the great struggle of life—producing noble tendencies rather than commercial results. A professional training is a secondary object, teaching excepted. The average student, of whom we write, does not take very long periods for study; boating, riding, etc., occupy most of the afternoon. His expenses will be from £120 to £300 per annum; few come off short of £180. A student is allowed to attend lectures in any college, but some of the colleges require their students to attend certain of their lectures. Of late the commissioners have cut down the number and emoluments of the tutors and endorsed professorships and readerships with a lavish hand. Judging from a parliamentary report the professors exert little influence, since they can attract few hearers. A few of these lecturers have exercised a wide power, as Ruskin, Green, Freeman, etc. Ten or twelve years ago the school of Locke and Hume were in the ascendant, but the late Professor Green of Balliol turned the tide strongly. He reconstructed traditional English philosophy in the light furnished by the systems of Kant and Hegel. But that which attracted young Oxford about him was the union in him of the speculative and the practical; the conviction which inspires and invigorates his philosophy, that to conceive the ideal intellectually and to realize it practically amid the world in which we live are but different aspects of one and the same endeavor. To his teaching, set forth as it was in a life of singular devotion and simplicity, may be most truly traced that great wave of philanthropic interest which has swept over Oxford with such beneficial effect. Nothing is more surprising to old Oxford men than the interest which undergraduates now take in questions connected with religion, morality and politics. Residence in Oxford forms an important part of education. Here there are debating societies, musical societies, libraries, etc.; here all

ideas prevail and must stand the test of reason, and a man soon finds his ideas attacked or questioned and himself driven to their defense. The examinations hold a prominent place and can be defended in their weakest point.

The religious minded undergraduate is seldom able to satisfy his soul with the exercises of his college chapel. Religion is nothing if not spontaneous, and all the arrangements of his college are associated in the student's mind with the idea of discipline, so it is in the parish churches that we will find him in his truest development. Women have entered since 1879. They can pass the same examinations as the men without any severe effort, tend well to exercise, have great feedom, and have shown that the criticisms have been groundless. Greek, though tottering, is still a required subject. The election agent meeting the non-resident M. A.'s, mostly country clergymen, finds a rigid conservative front. This is not the case with the resident M. A.'s. Ten years ago liberalism was the creed of most clever undergraduates, and conservatism rather the sign of an inferior intellect. But at present conservatism seems to be steadily gaining, grounding itself on zeal for church and empire.

The position of a successful tutor is a most noble one. He is thus able to influence the picked intellects of England. It is a difficult position to fill. There may be high attainments and poor teaching power, or there may be too much of the pedagogic spirit, treating the undergraduates as school boys. Every student has a special tutor to whom he takes work. Happy those who are under a first-rate man. This contact often ripens into a friendship, from which advice and much that is good may be derived.

GEO. F. METZLER.

Education: To Whom does it Belong? Second Edition, with a Rejoinder to Critics. By the Rev. THOMAS BOUQUILLON, D. D., Professor of Moral Theology at the Catholic University of America, Washington, D. C. Baltimore: John Murphy & Co.

The essay proper of Dr. Bouquillon covers 31 pp. The rejoinder requires 42 additional pp. The entire literature as to the question of the relation of the (Roman) Catholic church to education is very voluminous—too much so for the ordinary student. We get all we need from Dr. Bouquillon's pamphlets. He sets forth the real, authoritative, historic and present state of the question. The scholarly attainments of the author, his official position, the fact he wrote at the direction of his ecclesiastic superiors, and the further fact that his productions are endorsed by eminent officials of his branch of the church,—render his writings very important. The doctor clings exclusively to the (Roman) Catholic presentation of the school question, working as though there were no serious troubles between (Roman) Catholics and Protestants in this respect. His writings are valuable, especially to those examining this side of the question. In his discussion the doctor is entirely theoretical, giving no concrete illustrations. His notices of authoritative literature bearing on the subject are all of (Roman) Catholic authorship and furnish very valuable references. Such data bear on three aspects of the subject, and the respective literature is stated under each aspect, to wit, the principles, the laws, the facts as to the entire subject. He cites Taparelli, Costa-Rosetti, Sauvé, Cavagnis, Coppola, Riess, Jansen, Conway, Robiano, as to principles; the Decretals, the Councils of Hardouin, Maria Laach, Mgr. Roskovany, Acts of Pius IX. and Leo XIII., as to laws; Teomassin, Claude Joly, Leon Maitre, Stallaert and Vanderhaeghe, Lebon, Du Boulay, Jour-

dain, Bourbon, Karl, Denifle, as to facts. Throughout his first pamphlet Dr. Bouquillon is expository and not controversial. In his second he maintains good spirit, but does not yield a single point taken in the first.

The essays cover four questions: 1. The Right to Educate. 2. The Mission to Educate. 3. Authority over Education. 4. Liberty of Education. These questions are considered as they apply (*a*) To the individual, (*b*) To the family, (*c*) To the state, (*d*) To the church. He says, "There are three essential societies instituted by God to work harmoniously in conducting man to his perfection and his end: the domestic, the civil, the religious." He gives himself to the determination of "what are the reciprocal rights, duties and powers of these three societies in the intellectual formation of man." The words, right, mission, authority and liberty are carefully distinguished.

A man is not obliged to do everything he has a right to do. No one should neglect a mission, a prescribed duty. Authority enables one to move on in duty, overcoming obstacles. Liberty is limited by two facts: no one can do an act not morally right, and no one can conflict with the plain rights of another or others.

We can outline the following points: The individual (or the association of individuals), the family, the state, the church, are of divine institution; each has its respective rights, each has right to maintain its respective rights, each has right to self preservation and all things necessary thereto, each has right to teach, each has right to teach everything it knows; so far as the rest teach religion they must consult the church, so far as the rest teach political economy and secular studies in general necessary to citizenship they must consult the state; no one of the four can teach anything not morally right, no one can teach anything harmful to the other three; the church has right to see that nothing harmful to religions is taught by the rest, the state has right to insist that nothing be taught by the rest which would imperil its good, the other three must not conflict with the rights of the family, the family must not teach anything derogatory to the other three. The general principle is that neither can deny nor limit the rights of the rest; all four have respective rights, and the problem is how to get all possible good out of each for the rest and without friction to any one of them.

A peculiarity as to the reception of Dr. Bouquillon's pamphlets is that they have been most severely criticised by (Roman) Catholic writers. We have not noticed that any leading Protestant scholar has made an attack on the said writings. A learned opponent, noticed by Dr. Bouquillon and most of all influencing him to issue a rejoinder, is Rev. R. I. Holaind, S. J. Said pamphlet is titled, *The Parent First: An Answer to Dr. Bouquillon's Query, Education: To Whom Does it Belong?* Benziger Bros.

This pamphlet is bravely met by Dr. Bouquillon. The doctor does not enter a new field in his rejoinder, but reinforces, explains, expands, illustrates, etc., his first pamphlet. One can get an idea of the spirit of the rejoinder from the following sentence in § 1 thereof: "Education is one of those mixed matters in which many powers concur, and which is to be regulated amicably by the parties interested." Thinking objections may have originated from not making himself quite clear, he proceeds with each objection and sustains all his former positions. We have reason for congratulation in the fact that Dr. Bouquillon's paper was antagonized, from the fact it elicited the valuable, learned, timely rejoinder.

J. S. LEMON.

The Science of Education: Its General Principles Deduced from its Aim and the Æsthetic Revelation of the World. By JOHANN FRIEDRICH HERBART. Translated by Henry M. and Emma Felkin. London, 1892.

In his introduction to this translation, Mr. Oscar Browning tells us that the publishers deserve support in their endeavor to bring out educational literature of a high order; as a matter of fact, their efforts have not been sufficiently appreciated. The difficulty of Herbart's work in the German is increased by its literal English dress; yet, as Mr. Browning says, those who really want to know Herbart's views will be willing to *study* them. Some of the translations of technical terms are not happy, for instance: *Vertiefung* is called "concentration"; both *Anschauung* and *merken* are rendered by "observation," etc.

The sketch of Herbart"s life is helpful and sympathetic; the summary of his views by the translators will be found useful, though it fails to accentuate and modernize Herbart's most stimulating *motifs*.

Æsthetic Revelation of the World. Right conduct, the highest aim of humanity, must be the aim of education. The formation of character is the business of the school. The rise to self-conscious personality must take place in the mind of the child himself, and be perfected by his own exertions. Teacher must strive to reach, understand and guide the trustworthy power inherent in the child, so that the proper *conditions* may be provided for the *infallible* rise of natural self-conscious personality. Obedience, the first step in right-willing, must be preferential; the child must feel the moral to be its own authority (instinctively worthy), and moral necessity to be original (inherent inherited); but he must feel the right to be compulsory, whenever obedience to its principles is opposed by natural inclination judged to be wrong--the "categorical imperative" is the organized subjective product of ethical conflict. Poiseful ethical action has no imperative, categorical or otherwise, about it. The purist and highest type of moral judgment and feeling is æsthetical in nature, that is, absolute and not requiring proof. The slow, constraining (organic) force exercised by the dominant activity of pure right-relations we call conscience. [Notice Herbart's "poise"-idea.] The plan of life is is to be formed on æsthetical-moral judgments as a basis (moral harmony, poise). The æsthetic revelation of the world comes when the child feels its power to alter the direction of its desire, and of adhering to one inclination (stability, consistency, directness, heartiness, etc.—Greek) until another is ready to assert itself. If this freedom to alter the direction of desire is egotistic, worldly wisdom will dominate character; if it is altruistic (dominated by moral insight, practical reason), morality will rule the individual. Now the teacher ought to see that there is no doubt about the dominance of right; he ought to make the early right-impressions so strong (and the right-habit so stable) that the free bearing of the mind will receive its law from pure practical reflection (poiseful moral apperception). The perfect family life is the first necessary condition of ideal character-development, for out of it grows the interpretation of the world (physical and social) and the idea of God. This idea must not be forced upon the immature mind of the child. Instruction must give the child an opportunity to contrast a primitive natural state of life and a primitive religion (Homer) with the family life and religion [Change and contrast, etc.—Interest]. The result of such a contrast gives an introduction (point d'appui, apperception-system) to the progres-

sive revelation of the world, in which instruction takes two parallel courses: 1. Sympathy—the human, social, moral side; 2. Knowledge—the cosmic, natural, scientific side. These find their meeting place in God.

General Pedagogy. Ethics supplies the end, and psychology the means, of education, which is at once a science and an art founded on a science. When a child is grown he will set other ends (besides right) for himself. So teachers must take account of individual talents, dispositions, inclinations; there must be a *general stimulation* of the child's powers, as its future aims are unknown (all-round development via individual talents as apperception-centers). Starting point of education is individuality—child's idiosyncrasies must be respected, as the individual is not to be a mere type of the race.

I. Government (discipline). Object: To create order and to keep the child within bounds (poise). Means: Occupation, supervision, threatening and punishment; these to be supported by authority and love, and to be gradually withdrawn.

II. Instruction. Object: To determine the will toward conformity to insight derived from ethical ideas. Means: Both will and wisdom have their origin in thought-circles (wherein "thought" is representative of action and has kinæsthetic value). So instruction must use these. Immediate aim of instruction is *balanced*, many-sided interest [proportionate, hierarchical, integrated interest]. Interest and desire are different; interest depends on observation (*anschauung*) and expectation-desire, on demand and action. Focusing (*vertiefung* = translators' "concentration," President De Garmo's "absorption") and reflection (*besinnung*) — [energy and poise]–must alternate. (1) Quiescent focusing secures clearness (first steps in general method = preparation-presentation, analysis-synthesis); (2) progress from one focus to another secures association (second stage); (3) Quiescent reflection secures abstraction (system = third stage); progress from one reflection to another secures application (practice, habit-forming = fourth stage). Interest uses material of a child's mind: sympathy and knowledge. Knowledge interest: (1) Empirical (psychical = brain-exercise-pleasures of memory, etc.); (2) Speculative (scientific = curiosity, explaining instinct, etc.); (3) Æsthetical (play, art). Sympathy interest: (1) Sympathetic proper (personal, biological); (2) Social (gregarious altruistic); (3) religious (anthropomorphic, monistic). The sciences contain materials for instruction. The homogeneous must be emphasized (character-points) under the terms symbols, forms, things. Symbols (language, etc.) interest only as a means of expression (which needs as antecedents impression and apperception). Forms interest only in their relations to the actual (*anchauung* is not enough). Things are directly interesting (but not *all* things). Things are combinations of properties, so instruction may proceed analytically or synthetically. Course of instruction will be both analytical and synthetical. Material: Sympathy and science. Means: General method.

III. Training (translators' "discipline"). Object: To secure moral strength of character. Let ethical ideas underly the concentration-material (unifying, centralizing, co-ordinative material-center of interest). Stress, the moral through the use of the æsthetic [the beautiful and the ugly in character]. Character consists in uniformity (consistency) and firmness of will. Let great resolves accompany æsthetical judgments of moral beauty and ugliness [kinæsthetic moral-æsthetical functioning]; establish enthusiasm for the good logical culture, continuous employment habitude.

Let the teacher be natural and poiseful; keep the child's mind tranquil and clear; let education be self-education; have firm confidence in the hearty good-will of healthy children. These are a few of Herbart's nuggets, of which there are many more.

THOS. P. BAILEY, JR.

Une Année de College à Paris. Par ANDRÉ LAURIE, Paris, pp. 322.

Albert Besnard, at the age of seventeen, comes from the lycée of Châtillonsur-Leze, where he has finished his studies with distinction, to Paris to enter the lycée Montaigne. The superior scholarship here, the new customs and the great number of students operate to make him only an obscure member of his class, and the loss of his provincial honors plunges him in discouragement. He is diverted from study by idle and conceited companions, yet by the judicious management of his father, the influence of a comrade and a former master from Châtillon, and the guidance of a professor who finds him by chance in the library, he is led to apply himself so assiduously during the second half year that he takes the grand prize of history. The story is not very effectively told. The boy is too easily won from his unhappiness and idleness, and the changes wrought in him are too great for the time involved. E. M. H.

Le Patriotism en France. Par ED. GOEPP et G. DUDONDRAY, pp. 346. Paris, 1885.

That this book is designed for use in schools is not explicitly stated, but it is certainly educational and most excellent reading for young persons. It is made up of instances selected from French history down to the present century, of noble, generous and energetic conduct in times of peril to the country or its interests. The acts of men in humble stations have been chosen in preference to others. Everybody cannot be a king or a commander of an army, but everybody can devote himself, can sacrifice his wealth or his life for his country. The tales are clearly told, but impressive as the deeds themselves are the narrative would sometimes gain by more of the story teller's art. E. M. H.

Etudes sur l'enseignement et sur l'éducation, par Gabriel Compaiyré. Paris. Hachette et cie. 1891, pp. 330.

Wherever great change is going on in established institutions there is a tendency to reaction. To resist this tendency so far as it affects the progress of popular education is the object of these essays first published in the columns of the *République française* and now collected in a volume. Adopting as the soundest philosophy the saying of Gambetta that "To combat despotism and demagogy there is but one means, the education of all," M. Compayré is an ardent advocate of progress, but also of "order in progress." He defends the present system of education not because he is blind to its defects and faults, but because he sees its great excellencies. He would hold fast to what has been gained and reform abuses without destroying the whole of which they are but a part. The essays cover a wide field and give the reader a well directed and intelligible view of the present aspect of primary, secondary and higher education in France. The reader gains from them, moreover, some sense of the gigantic effort which the third republic has made to exalt the country by educating the people, and of the ability of the men who have labored with devotion to remedy in the only way possible the losses which the country had sustained. Along with the discussion of questions of current interest

there are reviews of educational works, accounts of foreign schools and methods, statistics, and summaries of official reports. M. Compayré's intelligence and moderation never fail him, and his style is always vivacious and clear. E. M. H.

First Steps in Philosophy, by W. M. Salter, Chicago, 1892, pp. 155.

The author is "feeling his way to an intelligible and satisfactory view of the world," and has not as yet a philosophy proper save concerning matter and duty. In the first physical part of his book the author shows that not only secondary qualities but even resistance, though more real and practical are only sensations. Form atoms and molecules are also subjective. Nothing whatever is left of the sensible world which is only an effect on us of an unknown cause. The author calls his position sensible on physical idealism, and says it implies supersensible or metaphysical realism. Our body and brain are of course only a tissue of sensations. Nerves cannot produce, but only are sensations. We have no warrant for saying mind is in the body. The world is not illusory but subjective and very real. The world is thus destroyed and reconstructed in the fashion so familiar with Kantians. The sensations are reality. It is felt to be sad to break with common sense. This view is a kind of perpetual ought rather than an habitually realized view. Materialism is simply uncritical and naïve. Thus mind is made an essence and not an accidental manifestation of matter, and cannot be explained by it. Thus only mind and not matter remains to be accounted for. Mind is yet the problem. Only metaphysics deals with cause and it is only a problem.

The Schoolmaster in Literature, with an Introduction by EDWARD EGGLESTON. Am. Book Co., 1892, pp. 608.

This consists of 36 selections from 21 authors, viz., Ascham, Molière, Rousseau, Shenstone, Fuller, Pestalozzi, Cowper, Goethe, Brontë, Page, Thackeray, T. Hughes, D. P. Thompson, Dickens, Wm. Mathews, Irving, Geo. MacDonald, E. Eggleston, D'Arcy W. Thompson.

Minerva, 1892–3. Strassburg, 1893, pp. 827.

This year-book of the learned world has just appeared for the second year very greatly enlarged. It is international in its scope, and includes libraries and technical schools as well as universities and academies. Under each institution the departments and their heads are named, and the plan, scope and work of each briefly described and the names of each chief professor given. It has a complete index of names. It makes a valuable handbook.

L'Education à Port-Royal. Par FELIX CADET. Paris, 1887, pp. 313.

The student of pedagogy can scarcely go to a better source for principles and methods than the saints of Port-Royal. These men had a conception of the object of education, not less elevated than that of the most modern moralist, while the energy of their faith and the sincerity of their contempt for the world enable them to teach with their ideals always in view. Devotion to ends that are remote and universal characterized all their maxims and methods, and this joined to an intelligent sympathy for the undeveloped powers of the child and a love for him which insured gentleness and patience in intercourse with him, made them teachers who had no rivals in their own time and few successors in any age. It is not

necessary to read far to be impressed with the truth of Racine's assertion that the Jesuits need not have feared them as competitors, nor have given themselves the trouble to procure their downfall and extinction. Their work was personal, and lent itself very poorly to adoption by disciples or imitators.

This book is not a history of Port-Royal. It is made up of extracts from the works of Saint-Cyran, Lancelot, De Sacy, Arnauld, Nicole and others who made up the distinguished company of Jansenists. What is most interesting in it, after the character of the men and women whose portraits appear here painted by their own hands or those of their intimate friends, is the fact that in pedagogy and morals what is wanting is not examples and principles, but wisdom and power to appropriate and adapt. In most of its fundamental principles, the art of teaching has made no advance since the Little Schools of Port-Royal were closed. E. M. H.

Histoire de L'Education des Femmes en France. Par PAUL ROUSSELOT. Paris, 1883, 2 vols. pp. 441-446.

If before the present century little has been done for the education of French women, much has been thought and said and the annals of female education in France are by no means vacant. Writers on the subject, both men and women, have had clear conceptions of what women should be, but they have differed widely as to the means of accomplishing her transformation. This history by M. Rousselot is full and complete. The centuries are treated separately and each social class has a chapter to itself.

After the fall of the pagan world, the Christian church charged itself with education, and in giving to it a monastic and ascetic direction, confined its benefits to men, unless we should except in a measure and for a brief time such women as became nuns. This, according to M. Rousselot, is the cause of the intellectual inferiority of women. Christianity set woman free, but it did so by separating her from man, not by placing her beside him. From this misdirection, France has been slow to recover. The capitularies of Charlemagne make no mention of girls, and the zeal of this monarch did not extend to women outside of his own household. The Reformation, which produced in Germany an extension of instruction to the lower classes, in France, where Luther's influence was little felt, made scarcely any change. There has been no lack of wise and able reformers, but as the government remained essentially feudal until the Revolution, no national movement could be undertaken, and their work ended with their lives or produced its main effect in other countries and at a later age. Even in the case of such revivals as that which produced the teaching congregations in the seventh century, the progress of instruction was greatly hindered by the lack of women sufficiently learned to teach. Madame de Maintenon trained her own teachers and, when those who gained their experience and received much of their slender learning from personal intercourse with her ceased to teach, Saint-Cyr and its excellent instruction were no more. Port-Royal would have had a short life, even if it had not been closed by royal order, for the Pascals and the Arnaulds were simply great personalities whose efficiency and ability could not be perpetuated. The history of France is long, and what is true in one century is not true in another; still succeeding ages show little but a variation in the degree of ignorance so far as the great mass of women are concerned. In the upper classes and among the réligieuses, the scale

has a wider range, yet the most distinguished in these classes owed their influence and charm rather to their quick and high intelligence and their association with superior men than to schools and preceptors. "Carefully brought up by her father" is the potent phrase that accounts for the superiority of more than one remarkable woman. The revolutionary period and the first empire were fruitful in schemes of national extent, but the period was too short and too tempestuous to establish any project on a firm foundation. Madame Campau, reader to the daughters of Louis XV. and chambermaid to Marie Antoinette, preserved in her private school in the quarter of Saint-Germain all that was most valuable in Saint-Cyr, and the new era as well. She founded a lay boarding school, an institution hitherto unknown in France. To her belongs the honor of having conceived the idea of modern woman in harmony with the needs of a society no longer feudal, and no longer monarchical after the fashion of the seventeenth and eighteenth centuries.

Possibly because the principle of natural selection has been less interfered with in the intellectual history of French women, France furnishes a list of female writers on education unequaled in any country for good sense, sound philosophy and elevated feeling. To Jacqueline Pascal, Madame de Maintenon and Madame Campau, must be added Madame de Genlis, Madame de Rémusat, Madame Necker de Saussure and Aimi Martin. These women had a clear notion of the woman they wished to form,and they did not sacrifice their ideals to an unworthy ambition or the demands of an unenlightened public opinion.

The Third Republic has provided for the education of all classes without distinction of sex. It has emancipated itself wholly from the feudal indifference, and the feudal incapacity to conduct national reforms. E. M. H.

Education et Instruction. Par OCT. GÉARD. Paris, 1887, pp. 328.

This is the last of four volumes bearing this title, and relates to higher instruction, as the other three do to primary and secondary schools. M. Géard takes the opportunity afforded by the opening of the new buildings in which the new clinic of the faculty of medicine, the higher school of pharmacy, and the faculty of Protestant theology are housed, to give an external history of a part of the schools for higher instruction in Paris—namely, the faculties, and the higher school of pharmacy which is incorporated with the faculties. The old buildings are described, the need of increased space, laboratories and libraries is shown, and a full account is given of the action finally taken which resulted in the erection of the spacious and well appointed structures which now meet the wants of all who seek advanced instruction. This takes seventy-eight pages. Then follows a report of the inquiry concerning the bachelor's degree, the examinations required for it, the changes to be made, etc., etc., together with a history of the degree and a discussion of its value. One hundred pages are given to the debates of the academic council and the faculty of sciences on the subjects connected with the enlargement and construction of the buildings described in the first part of the book and presented by plans in the closing pages. E. M. H.

Notions de Pédagogie. Par M. H. JOLY. Delalain Frères. Paris, 1884, pp. 296.

Not what is useful to know, but what is useful for developing the faculties, is the question discussed by M. Joly. He emphasizes the

fact that man is an organism no part of which can be profitably trained without reference to the whole. Attention being fundamental to all intellectual progress, he would plan exercises for the young child that would attract and hold his attention to the end of giving him control of it. Through all the period of his school life he should be encouraged, forced if need be, to put forth effort to the end of gaining will power. All branches of knowledge may be made to serve these ends, but as instruments for developing the moral and æsthetic faculties, he believes the languages to be superior to the natural sciences. The practical utility of an art or science is not at all that which ought to recommend it to the educator; in fact the more its utility is practical and special, the more important it is to postpone its acquisition to the schools which address themselves to special vocations. To know the rules of method clearly, to have a habit of consulting them with discernment in order to apply them when it is necessary, to see in everything the need of order and simplicity which united to action make true elegance and almost beauty,—that is an education useful to everybody and for all purposes. What is meant by teaching too much, giving too much information, advancing the child too early, is pointed out and illustrated.

A bibliography of pedagogical works is added to the text.

E. M. H.

L'Instruction Civique. Par GABRIEL COMPAYRÉ. Paris, pp. 346.

This book is prepared expressly for the primary normal schools, and is only the faithful and methodical development of the programme of civic instruction established by the decree of 1885. By that decree the professors were recommended to avoid such minute details, such subtleties and curiosities as would destroy the practical and professional character of normal school instruction. Hence there is no attempt at erudition or research, but plain, clear, and for the most part general statements of the things most important to be known on the subject. A brief history of the past government and an explanation of the general principles of government constitute the first chapter; the present form of the national government is treated in detail in the second; and the third has for its subject the department and the commune. A short treatise on political economy occupies forty-five pages. The selection of matter is so judicious and the style is so admirably clear and simple that any reader in search of information concerning the French government could not do better than to possess himself of this manual. M. Compayré's name is, of course, a guarantee of much more than this.

E. M. H.

L'Education du Caractèu. Par ALEXANDER MARTIN. Paris, 1889, pp. 377.

M. Martin, director of the course of pedagogy in the faculty of letters at Nancy, has here brought together in an extremely well digested and interesting form the best that has been written on moral instruction. It is doubtful if any more comprehensive or better presentation of the subject has been made. No one narrow method of training is recommended, no specific is prescribed, but many and various forms of instruction, combining liberty with obedience, are fully discussed. Not all responsibility rests with the school or the teacher, though the obstacles to home training are shown to be well nigh insurmountable. The impossibility of giving much attention to morals in the lycées is fully recognized, as it is by

many other recent writers, but the system of large boarding schools is so identified with the national customs and feelings that a change is attended with great difficulty. All the plans hitherto suggested, and the customs of other nations, are reviewed. The plan which most commends itself is that of selecting a small lycée in a city where living is cheap and where a number of families of the middle class will receive boys as boarders after the German custom. Even then it will probably be better to place only the younger pupils outside the school, lest the change from the restrictive discipline to which the *internat* has been accustomed to the greater liberty of the family, prove disastrous. If no great harm results during the first year, the system can be extended, and if it does, a return to the former system can be made without loss.

One rises from the reading of such a book with a measure of depression, for in no country or class are the parents or teachers numerous who possess the intelligence and devotion necessary to such training as is here contemplated. That the normal schools are providing such admirable instruction for prospective teachers is encouraging—nothing better can be done,—yet we must still look for a slow evolution of the moral sense. E. M. H.

L'Enseignement au Point de Vue National. Par ALFRED FOUILLÉE. Paris, 1891, pp. 451.

Education that makes a man—not a laborer, not an engineer, not a doctor, not a statesman even, but a citizen, a citizen whose elevated character and cultivated judgment will give lustre to the state and raise it in the esteem of other nations,—this is the education that M. Fouillée pleads for. In opposition to the present demand for shorter and easier courses, that students may become wage earners at an earlier age, and the tendency to accomplish this by dropping from the programmes the studies usually classed as the humanities, we have here an almost impassioned argument for an increase of instruction in all that influences the development of character and intellect, and the omission of what simply loads the memory, but affords no discipline to the judgment or taste. The argument rests in part on the promise that the French nation is by inheritance and history pre-eminently intellectual and artistic. If it is to have any rank among nations in the future, it must gain it by observing the laws of heredity, and seek to distinguish itself in the fields where its genius has formerly achieved its greatest triumphs. While any branch of knowledge can be so studied as to be an ethical discipline, M. Fouillée believes that the present methods of scientific study neither aim at nor accomplish this, and that physics and natural science can never be so strongly ethical as literature and philosophy; certainly cannot accomplish the highest elevation of mind without the aid of the humanities. Learning a natural science is commonly a simple acquisition of facts. If a child studies the ellipse after having studied the circle, does his mind experience any metamorphosis? If in chemistry he passes from sulphur to iodine, is there any intellectual progress? But the moral sciences are a perpetual ascent. If, having studied the laws of the emotions and passions, the pupil goes on to those of the intellect and the will; if he passes from logic to morals, and rises to reflections on nature and the value of existence, it is clear that he advances and is elevated. If, in political economy, he goes on from the laws of production to those of exchange, he will have a more complete idea of the sources of wealth. In elementary schools, the descriptive natural sciences are in their place. In secondary schools, only science types should be taught, namely, physics and mathematics;

these are the base of all others, and every pupil who has been well instructed in these is prepared to study any science when in a higher school he pursues a specialty. To simplify scientific study, the philosophic spirit and methods should be introduced; principles and general conclusions should be taught; the human side shown, the part the mind had in their foundation and their discoveries. The development and progress of scientific methods are an epoch, and it is much more important in the education of youth to interest them in this epoch than to make them enumerate and inventory facts and laws. What is truly scientific in the sciences is the connection of causes, and this is at the same time beautiful and educative. The new plan of making studies serve some immediate end, of learning languages with as little grammar as possible, of getting a knowledge of ancient literature through translations, is shown to be false in theory and barren of results. The principle of the new plan is to learn the living languages to speak and the dead languages to read. The result is, the living languages are spoken no more than formerly, and the dead languages are read less. But the end of education, it cannot be too often repeated, is not to speak living languages nor read dead languages; it is the culture of the intellectual forces for the sake of the nation and the race. For this end nothing can ever take the place of Latin themes and Latin verse. A young man who has not composed a few Latin verses, who has not tried to give to his thought and feeling that superior form which the ancients called divine, has not received a liberal education. He will never feel perfectly the beauties of the great poets, nor the poetic harmonies of the great prose writers. But not only must the thorough study of Latin be preserved, philosophy and the moral and social sciences must be more practically and liberally taught. Instruction will cease to be liberal if it is lost in the particular studies of industry, commerce and agriculture, of jurisprudence and politics; but it will not cease to be liberal and will become practical when it concerns itself with the great economic principles and the social laws which preside over industry, commerce, agriculture, jurisprudence and politics. It will move then in an environment at the same time positive and moral. As philosophy is, so to speak, the morality of science, political economy is the morality of industry, of commecre and of agriculture; natural law is the morality of legislation, and social science is the morality of history and politics. Moreover, philosophic studies do not lose themselves in details. They are the remedy for the dispersion of mind to which the natural sciences tend. Their object, however rich, even infinite, it is, is still one. Its end is unification and its processes are processes of concentration. If France will save herself from an intellectual Sedan, she must have a governing class thoroughly instructed in all that really enlightens and elevates the mind; a class of men who have submitted to a discipline and passed tests that exclude mediocre and frivolous intellects. The scientific hegemony has always belonged and will belong only to nations literary and philosophical; the progress of science is in an inverse ratio to the mechanical and utilitarian instruction in the sciences, while it is in direct ratio to the progress of literary and philosophical culture. The same is true of political hegemony. It is not the German generals alone who have triumphed over the French armies. They have been beaten by Kant and Fichte, by Goethe and Schiller, by the Humboldts, by Gauss and Helmholtz, as well as by Bismarck and Moltke.

The style of M. Fouillée is animated and forcible, and his argument thoroughly elaborated. E. M. H.

NOTES.

T. C. Horsfall is one of the clearest sighted of all the educators in England. He says that while England is the most wealthy nation, most secure from invasion, and her people nearest together, and, therefore, might have best cultivated the art and science of right living, or education, she has in fact been most disgracefully negligent of it. She ruins her people by offering no amusements, save those that are degrading, and is densely ignorant of the art of making people become what they ought. She has seemed to hold with Dogberry that to read and write come by nature. Matthew Arnold was very richly endowed with the rare qualities which could have made a good school inspector, but he had no incentive to study the science and art of education as it should be studied. How much education can make nature, we see from the fact that the finest nature, if reared in a savage environment, would be bruitish and sensual. The most important part is the education of feeling, and especially the right direction of love and respect, which must come into effective contact with the best in teacher or parent. More care must be taken to get teachers of the finest possible moral, mental and physical quality; train them well and keep them at their best. Schools must not perpetuate ignorance or breed deadness of mind and its resulting vices and impotencies. That system is best that develops greatest power of love and admiration, for these give affinity and power of assimilation. First, from his origin man has lived in most immediate contact with nature. Life has been a struggle face to face with nature for food. Her colors and forms and motion have been the great spectacle of interest of every sort. Religion, mythology, poetry, science and art have nature for their matrix and their alma mater. Now in cities men are shut away from nature, and it is no wonder they degenerate like the eyes of fish in Mammoth Cave. "At the present moment there are hundreds of thousands of people in our large towns who do not know that apples grow on trees, or what a bee is like, or whether a squirrel is a bird." The greatness and beauty of nature augmented the sense of the existence and of the beneficence of God, and if the church knew its interest, it would preach the glory and loveliness of earth, as should every school. The heart and mind can no more dispense with the influence of trees, grass, sky, flowers, birds, than the stomach can dispense with the other country products—milk, bread, beef and fish. If the original form is denied, the concentrated form of pictures must be used, as physical exercise must be taken in the form of gymnastics if the natural exercise is denied.

The other kind of knowledge fit to develop admiration and love is contact with the best lives and deeds of the best people. Even in the country there is strangely little knowledge of the noble lives of great men and women. The saint worship of the Catholics

tended to keep lives from becoming cheap and bad. To provide children with fit heroes and heroines in place of the "penny dreadfuls" and the "half-penny horribles." The finest literature is saturated with nature and with great lives. Pictures go far beyond words here and are best channels of these best influences. There is now a very high death rate in Manchester, but the reason why we die too much is that we are not enough alive, that only the lower part of the nature of too many of us is ever born. A ship cannot be steered unless it has momentum. In education the superfluous is often the prime necessity and keeps the heart and brain of childhood from starving, and brings it to make good and not bad use of the three R's. Art is a good means of reaching the lowest. Men in Manchester so sottishly drink, gamble, indulge in licentiousness because there are few places of better recreation open, and in youth better tastes were not formed. The writer asked for £2000 to buy works of art for elevating schools, to be loaned each school for a month to a year on conditions that the teachers take the pupils to certain parks, gardens, museums, etc. Series of historic pictures, beginning, *e. g.*, with Goodwin's Invincible Armada, portraits, landscapes, plants and animals, well described, can cause very thorough teaching and comprehension of every topic of elevating schools.

Imagine, if so great an effort be possible, that the government should take a course without precedent, viz., get its information from real experts and really ask them to consider what was the *very* best to make both quality and quantity of life better, so that for all human beings it should be better for them and for the world that they should be alive and not dead. A General Gordon at the head of the educational department, to make children truthful and more alive in body and mind, would do more for industrial training and supremacy than all the technical schools in the world. It is of no account if boys are left willing to lie, to teach them to lie grammatically and with good accent in all the tongues of Europe. The English climate is favorable for muscular work, but unfavorable for sedentary life. Artificial transportation has weakened English legs; dampness, coal smoke, mill work, crowded population, noise, electric lights, bad drainage, etc., have diminished physical strength if not decreased weight. Too little space for wholesome games causes many boys to be committed to prison because they have no outlet for high animal spirits and physical energy in orderly sports. In the county of Middlesex alone, fifty children a year are killed playing in the street, having no other place to play. It is impossible to overestimate the dangers to a country from a decline in the working power of its people. Men were never so clever at making fools' paradises, and some optimists can almost see improvement in the last ten minutes. The diminution of crimes of violence on which we place ourselves, is due to the low physical condition of even the soldier class. Secret vices, lying and deceit are more common. We give up strong physical exercise too early. It should be stopped only a year or two before one wishes to die. Good exercise to the point of perspiration will ease even a burdened conscience. The few now know what is requisite for a healthy life, and with well formed habits of living it, Manchester would soon become a place where it would be as possible and easy to live a healthy life as it now is to drink, gamble, and indulge all lower passions. Educational systems must give the habit of spending leisure well after school life is over. School often makes children hate wholesome recreation when they leave school. Spelling and grammar make them hate books and libraries, and very many later lose the power to read. Every boy and girl should be taught

swimming and the most possible active games. Exercise enables underfed children to get more good from scanty food. Chess, checkers, rounders, tip-cat and many other games are commended.

In his hand-book to the Art Museum, of which Mr. Horsfall is the head, he enlarges on its use in acquainting children with the best feelings and thoughts of the best people. "All great art is praise," says Ruskin. To appreciate pictures of the best lives, deeds and thoughts, the pupils must know much more than the picture can tell. Collections in the Museum are grouped educationally and in different rooms to show plants, animals, birds, scenery and objects in and near Manchester, history of art, art processes.

In his address on universities at Oxford, Mr. Gladstone said the early universities supplied the battle ground on which all the living energies of the time were in constant struggle. Not only the great central church power as against local forces, but sovereign and subject, seculars and regulars, schools of philosophy, careers of education, the municipal and the academic forces continually rocked the cradles of these great institutions, and the fact of so much growth amidst so much contention shows with how vigorous a life the body politic was endowed. * * The renown and greatness of the Oxford Franciscans may, perhaps, best, as well as most briefly, be estimated from the number of cases in which they acquired that superlative distinction of mediæval learning—the appropriation of a special characteristic and laudatory epithet to their names. They figure largely on the Oxford list which I have brought together—Alexander Hales was *doctor irrefragabilis;* Duns Scotus, *doctor subtilis;* William of Ware, *doctor fundatus;* John of Baconthorpe was *doctor resolutus;* Richard of Middleton was *doctor solidus;* Burley was *doctor simplex;* Bradwardine was *doctor profundus;* Roger Bacon was *doctor mirabilis;* William of Ockham was *doctor invincibilis et singularis.* * * On the whole, it could not but be that the world power should gain largely in force upon the church power, and of the world power, in its least groveling and most upward aspects, the university was the proper representative upon the field of human culture. On the climax of this change I may presently have to say a word. For the present, I have only to observe that, according to the principle of old English law, the university as such is a lay and not an ecclesiastical foundation, and that this principle is a deep principle, and is also a just principle. We have before us at the point we have now reached the idea of the university fully formed to harbor, cherish and develop all the knowledge suitable for training, which the rolling years might add to the human store, both its traditions and its acquisitions, or, in the words of Euripides —*πατρίους παραδοχὰς ἃς θ' ὁμήλικας χρόνῳ κεκτήμεθα.* In the chart of that knowledge, theology had not a chronological precedence, except, as we may presume it, in cases where the nucleus of the university lay in schools attached to ecclesiastical foundations. Speaking generally, the foundation, according to the old formula, was in arts. The Trivium and Quadrivium, not tied down to the limitations of their first intention in their several items, but with a more generous and expansive meaning, were in possession of the ground. But theology soon obtained its place and asserted something of a maternal sway. Still the universities were the first systematic effort of the lay mind of self-assertion and emancipation. The chief dangers before universities are probably two—one, that in research, considered as apart from their teaching office, they should relax and consequently dwindle; the other, that under pressure from

without they should lean, if ever so little, to that theory of education which would have it to construct machines of so many horse power, rather than to form characters, to rear into true excellence that marvelous creature we call man, which gloats upon success in life instead of studying to secure that the man shall always be greater than his work, and never bounded by it, but that his eye shall boldly run, in the words of Wordsworth,

"Along the line of limitless desires."

Every one of the six chancellors of Oxford since 1772 has been prime minister. This shows at Oxford a strong tendency to the exigencies of public life. The recent self-renovation and extension of both Oxford and Cambridge show them still young. Their future pre-eminence will not be, as in the last century, a future of somnolent predominance. Each must learn of the other, but neither must ever be ashamed of its distinctive character. In its inception the university was a protest and a guarantee against the unchecked predominance of the ecclesiastical order. The secular and churchly powers should work side by side as in the past, competing but not estranged. This concord must not be broken by the disappearance of theology from the academic precincts. If there be a Creator, theology as a science, dealing with our relations to Him and the grounds of knowledge, may appeal to the very flower of our youth. May *the Lord be our light*, which is the Oxford moth and not our darkness. Oxford has made more men of action, Cambridge more men of thought. Wycliffe and Newman were thinkers, whose written word passed into action as wine into blood, but through the deeds of others.

Prof. Von Holst well says, in substance, that what this country has done in the past is easy when compared with the problems in store for us. Our problems make demands upon the people intellectually and morally such as have never been made upon any people of the earth. Material prosperity cannot secure our future. If other agencies do not make this a source of strength, it will be a source of ruin. Our material development is going on at a bewildering, break-neck rate, and a mass of problems of the first magnitude, more difficult and complicated than were ever imposed on any state before, are crowding before us. In elevation of the plane of mental and moral life, we must attain the very highest standard to prevent disaster. There is in the United States as yet not a single university in the sense attached to this word by Europeans. All the American institutions bearing this name are either compounds of colleges and universities—the university as an after-growth figuring still to some extent as a kind of annex or excrescence of the college—or hybrids of college and university, or, finally, a torso of a university. An institution, wholly detached from the school work done by colleges, and containing all the four faculties organically connected to a universitas literarum, does not exist. I have not only visited, but have lived in a number of countries, and the results of my observations of their higher educated youth are that, though by no means as to knowledge, yet as to the earnestness, steadiness, and enthusiasm in the pursuit of knowledge, the American students stand first. And nature has not been in a stingy mood when weighing out their allotment of brains! Give them but the opportunities and you will soon see whether they need to shun the comparison with the scholars of any other nation. They are handicapped in the race, handicapped in a way which makes the blood of a true friend of this country tingle with

impatience. The most effectual way to lift the masses to a higher plane—materially, intellectually and morally—is to do everything favoring the climbing up of an ever-increasing minority to higher and higher intellectual and moral altitudes. Therefore, universities of the very highest order become every year more desirable, nay, necessary for the preservation and the development of the vital forces of American democracy. Universities must teach how additions to the sum of human knowledge are made. They must be nurseries of what Matthew Arnold calls "the remnant," and everything depends on the proportion this remnant bears to the unsound majority. Here it must be enormously large to secure the safety of the commonwealth. It will surely be found too small if the few do not go to work in dead earnest to provide for educating university-taught professionals, who shall be missionaries in every walk of life, imposing a new, large and high way of thinking, feeling and acting upon the unsound majority.

Hon. Charles Francis Adams condemns the latent idea that there is some subtle connection between oral and written works. Composition writing is distasteful, like declamation or oral spelling. The art of expressing one's self clearly and vigorously in English can be got only by constant practice under judicious criticism. Greek and Latin are rendered into grotesque jargon, specimens of which are reproduced. The work of marking these efforts is dreary and deteriorative and saturates the teacher's mind with dull commonplaceness. Perhaps, he says, the present Harvard system of entrance examinations is "an omnipresent incubus on all correct preparatory instruction. May it not tend to make skill in cramming supplant the art of education?" Good teaching has been said to be impossible if an examination by an outside person is to be prepared for. The influence of secondary schools on primary has been disastrous. The latter for their own sake have been disparaged. The same is true of the influence of colleges on preparatory schools. The Cambridge system, he fears, works serious educational injury. Why not do away with entrance examinations and admit by certificate? Then the secondary schools could educate and not cram. A superficial examination is largely a question of individual nerve power in the face of an ordeal long anxiously prepared for. Prof. Goodwin adds that tests by extemporaneous composition would have disclosed a still greater depth of ignorance and carelessness, and thinks Harvard instructors should not waste more time in the vain effort "to enlighten the Egyptian darkness in which no small portion of our undergraduates are sitting." Remedies must be applied at the foundation and not at the top. The future of higher education depends upon the success of a revolution in our lower schools. No bachelor's degree should be given to one who cannot write English.

The features of our best schoolships, as, *e. g.*, the Saratoga, are that they are in no sense now reformatories. Any boy can be dismissed at any moment. Everything is free. There is no corporal punishment. A long list of possible offenses is printed and the precise penalty for each is posted. "Good conduct boys" can go ashore any afternoon "on his anchor," i. e., he simply announces his departure. There are only two studies at a time, and each book of the library has a catalogue of the library bound in it. There is of course universal control of boys on ships. The classes to which each boy is graded in his diploma at the end of two years have defined the exact work each pupil can do. The first class in naviga-

tion, *e. g.*, can lay off courses, work errors of compass and dead reckoning, take altitudes, and find longitude by chronometer, etc., etc., while those with second class certificates can do less of fewer things, all of which are enumerated on the back of each diploma.

Prof. Willmann of Prague thinks the "golden section" of Zeising, which is nearly 1 : 1,608+, may be introduced to enliven mathematical instruction. F. C. Pfeifer and later Huttler had developed these methods before, but Willmann has tried it practically in his seminary and finds a tendency to the above proportion in the relations of length to breadth in writing paper, books, tables, windows, paintings, facades, and even in organic nature.

Few, if indeed any, writers on educational subjects in our country today deserve more careful reading than Mr. Samuel Thurber of Boston. Would that he wrote more! In a recent pamphlet entitled, *To What End do High Schools Teach English?* he says the term and thing "fitting school" are unknown on the continent of Europe. Secondary education is an independent end in itself, and its representatives are not concerned chiefly with getting most boys into college or winning honors. It is for this reason that foreign systems have a peculiar fascination—we feel ourselves in a clearer air when studying them. The leaders of secondary education there are large minded, and come face to face with the problem what the nation demands, and what youth needs, and what science and pedagogy suggest, and are not so absorbed in entrance examinations. They ask whether the colleges do well by the boys they send, and perhaps ask which does best on the whole and not which standards of admission are most tasteful. They must study laws of mind and of education independently without external bias. The high school teacher of English does not aim to make great writers. Here, too, secondary education must lead its own life and work out its own laws autonomously and adapt itself to the enthusiasm and interests of youth at its age and stage. The tastes of the youth need to be consulted more than those of the child, yet his education must not be limited by his own desires. He has leanings, but has not yet chosen his vocation. Hence secondary pedagogy is very hard and must be an independent problem. Personal competition, to which boys are prone, is to the struggle with objective difficulties what drunkenness is to inspiration. The class or platoon front method of teaching English is bad. Identity of preparation kills all interest. Thirty pupils do no more than one if all do the same thing, but if each does a different thing they do thirty times as much as one. They must cease to rely on elbow touch and each work up a topic and report orally or in writing to the teacher, and to the class so far as time permits. Examinations grope for the residuum which a remembered process has left in the memory. Any mental process conducted under the anticipation of an examination carries an incubus. Writing should be impelled by some positive mental content which impels to tell it. The great note of the schoolmaster-mind is to schematize, paradigmatize, skeletonize, or in a word, methodize. This makes text-books dull. Spontaneity and some desultoriness are better. The more original and fresh the teaching the more impossible is a syllabus. Rhythm should base on the five-foot iambic, and poetry may be chanted and even sing-songed a little to get the sense of rhythm. The subjunctive is disappearing from English. This and the sentence sense need especial cultivation. Examinations are to be passed and tend to prevent pupils from surpassing them. Pupils now write on

every subject, and often far too much skimble-skamble stuff, and thus fall below their best knowledge and neutralize all the efforts of a special English teacher. While English literature needs a special teacher, the language composition work should be divided among all the teachers for their own good and to give efficiency and tone to the work. President Eliot's plan is Lancasterian and would debase the monitors to helots. Irresponsible, voluminous scribbling should be decreased. Many excellent topics and problems are suggested.

Hon. Charles Francis Adams utters a timely warning against the Columbus gush and jubilation that at times come dangerously near to cant and falsehood. His voyage was the act of a heroic but not a great man. But America was discovered on the very eve of the great religious struggle between Rome and Protestantism, and of the great political struggle between constitutional institutions and absolutism. In these warfares Spain was the representative of both Rome and of absolution. During the sixteenth century alone, Spain extorted by robbery and cruelty 700 millions of dollars — a sum for war purposes equal to ten times that amount now—and used it mostly to maintain the wars of Philip II. and other enemies of liberty. Spain thus "looted" two continents to exterminate Protestantism. The first 128 years after Columbus are perhaps the darkest periods of history. Had America been discovered by a German or an Englishman, and its southern parts been colonized by men of Teutonic stock instead of by Spaniards, how different and how more beneficient the result. It was not "white paper" upon which the Puritans began to write their record. Columbus has little credit for anything good in the western world to-day.

Dr. H. Ling Taylor of N. Y., says our cities are a kind of biological furnace where life and posterity are sacrificed to produce products of trade, science, etc. This ordeal gives individuals a finer temper, but weakens health. Skin-culture is neglected, fatigue seeks high room-temperatures. Children eat too much animal and saccharine food, are used to hard pavements, brown and red tints, constant noise, jars, electric lights, instead of the green and blue, and quiet and calm of country. The city child leads the life of a trainsman, viz., constant noise, change and hampered movements. School weakens instead of strengthens constitutions. On first seeing grass New York children rolled on it like animals. School should impose no task requiring great precision or intensity. Teaching technical botany has destroyed a natural love of flowers. But the latter is far better. Enforcing history has killed a natural taste for reading. It is bad for a nation when the cerebrum sucks up the cerebellum. Homes in flats drop the kitchen, the heart of the home. Children see little of their fathers at home or of men in schools. Selfishness and sentiment hurt the body. First, last, and only children or those in large and small families have their special attributes. Life is a tissue of habits which are more than maxims. No child can grow up natural or healthy without much judicious neglect. Over-caution and over-attention are always bad. It is almost impossible to bring up good and well children in the city, and the chances for the poorer classes are better than for the rich. The nerves are ever fiddled on, and the power to face the disagreeable or difficulties is lost.

The report of the special committee of the Cambridge (Mass.) school committee on grammar school instruction recommends the abolition of examinations, the appointment of teachers without grade to work with groups of either exceptionally slow or bright

pupils. Grammar school sections may be for four and for six years. Geography is divided: political geography being taught as history, and physical geography as science. Elementary physics and the rudiments of algebra and geometry should be taught in the grammar school. To equip themselves for new studies all teachers must attend one hour meetings or lectures on Saturday morning.

Constance Naden left papers after her untimely death which have been lately published. She was a "hyle-idealist." "Everything is a think." *Quot mentes, tot mundi.* Yet she held that life and consciousness are only the upshot of hylic energies. Reasoning is a series of steps, the first of which originates in an observed group of facts. Her principle seems to be the philosopher's *salto mortale.* The *L'universe, C' est Moi* of idealism and pyrrhonism are for her the same.

Professor Andrew Seth says, knowledge essentially refers to an object of knowledge or reality. Idealists must admit that it *seems* to point beyond itself. This is true even of self-knowledge. By means of our subjective states we become aware of other existences which cannot be present *in existence* in us. Knowledge as a process is subjective. Men have turned the subjectivity of knowledge against its objectivity and used its notion as an argument against its possibility. Save Hume and Kant the possibility of knowledge has been a growing difficulty till it has become the chief topic of philosophy. Its business is to doubt, and it has made this difficulty. A philosophy of belief is now a necessary preliminary of all scientific and metaphysical inquiry. Crude, naïve, uncritical realism needs careful sifting. It is a natural primal instinct. We first know the object and not the sensations. Thus, say Spencer and Reed, we start with judgments, not perceptions, and that by analyzing these we reach sensations. We do not begin by studying our minds and inferring reality. Having a sensation is very different from being conscious of it. Consciousness of sensation is not primordial, as Spencer said, but very late. Primal knowledge is practical reference, which is a form of recognition as deep as reflexes. Now reflection supervenes and establishes idealism or even skepticism. Realism must justify itself at the bar of reason. Epistemological idealism is an effort to obliterate the distinction between knowing and being. Its vagaries bring us back to a deeper realism. Special arguments are drawn from the physiology of sense organs. Hume says we never get any immediate intercourse between the mind and its object, but Aristotle said knower and known are one. Immediacy, says Seth, must be given up before any true knowledge of perception or realism can be established. Hamilton admitted that consciousness testified to duality, and said that the fact and the truth of testimony must be distinguished. Versus the Scotch realism which puts the mind's nose up against things, the two worlds are totally disparate. There is a leap, a solution of continuity. The table I touch is as inexorably out of consciousness as the remotest star. Objects are extra-conscious, trans-subjective or transcendent. The real world cannot force an entrance to the ideal at any point—not an atom of it *qua real.* Here skepticism comes in and tries to dispense with otherness. But selfhood is isolation in existence and fellowship, and fusion in knowing. Knowledge is not an entity stretching across from subject to object, but across the inane there can be no bridge. Things cannot *be* each other conglomerately. Idealism is thus a criticism of realism, and as a substantive theory it is absurd.

Sir I. C. Browne says woman's foot is flatter than man's; her brain lighter in proportion to her height. Though oftener attacked by insanity, does not half as often die with loss of brain substance. General paralysis destroys four men to one woman. The male brain is larger among savages and varies more. Very big and very small brains, like geniuses, idiots, giants and dwarfs are more frequent among men. The sensory occipital lobes are larger among females, the motor or parietal lobes are larger in man, while the frontal lobes are alike. The difference between the hemi-spheres is greater in men and so is the specific growth of the cortex and the numbers of accessory sutures. The vascular supply and diameter of arteries is larger in the posterior lobes in women and in the lateral lobes in man, and blood in the male contains more red corpuscles. Old women want affection, old men are fidgety. Out of 187 upper and middle class girls, 137 complained of headaches, and 37 were short-sighted. Cells must not be stimulated beyond their power of taking up nutrument. Over pressure tends towards apathetic dementia, makes irresolute, brings "queer thoughts." We may have cyclones of mania, anti-cyclones of meloncholia, hurricanes of morbid impluse, or the settled bad weather of moral perversion. There is insomina, a stupor, anæmia, or delicacy, general lowering of nutrition—*anorexia scholastica*, or appetite for unsubstantial food. The effort to educate young men and women on the same lines is sure to be bad for both. Parliament cannot annul what the prehistoric protozoa have decided. It is not a question of superiority or inferiority. Each sex is higher and each is lower. In competition they are mutually destructive. Intersexual competition in education is ruinous.

President David Hill says materialist and realist are alike products of reflection; consciousness of objects and objects of consciousness go together. Every psychosis has a neurosis, but the reverse cannot be so certain. Consciousness is better called a generous epitome of life than an epi-phenomenon or appendix. It needs and is conditioned on circulation, respiration, nutrition, temperature, age, sleep. Consciousness is said to be exclusively connected with neural disintegration, and its intensity imersity as the central transitions of stimulus into action. It is like a large hall lit by many changing gas lights. Why does analytical psychology arrive at an ultimate psychic fact, e. g., difference, while synthetic psychology starts from an unconscious automatic activity? In lower life are psychic manifestations beyond the phenomenon of cellular irritability. Psychic elements existed long before consciousness; they are manifested only through consciousness, but exist as its pre-conditions. This is the truth of pre-existence and metempsychosis. Lloyd Morgan says the monist may say that every mode of kinesis has its concomitant mode of metakinesis. All matter is not conscious, but with organic evolution has been a metakinetic evolution culminating in conscious thought. We know only our own mind, all else is inference but recurring. This view derives life from prexisting life. There may be a superhuman cosmic consciousness. The last vehicle of psychic action and the only medium of conscious unity may not be brain cells. Evoluting thought cannot rest short of one self-existing reality. The motion of objects cannot become the sense, still less the consciousness of motion. All thought is from pre-existing thought. The creative power is innocent. Man is a microcosm or mirror of the world. Thus mind is not uncaused and is not caused by material motions.

Some time ago, writes Mrs. A. H. Putnam of Chicago, we had quite a discussion with our drawing teacher on the question, "Do little children grasp the idea of form in its wholeness (through color) or the outline?" To test the question, I asked our directors—after giving a good many ball games, to call on the children for "pictures" of the ball, letting the child choose his own medium of representation. We provided water colors, chalk colored crayons, slates, paper and pencils, and the sand table. They were to have no directions whatever, the expression to be as free as possible. From the different kindergartens I received 97 "pictures." Of these, 87 were outlines of the ball, four were made by dots covering a surface(●), which I think meant the stitches of the crocheted cover. In six cases, the child began at the center and painted or scribbled to the circumference. In some instances the strings which were attached to the balls were correctly placed, but in most of them it (the string) was drawn entirely away from the ball, and in four or five instances the paper was turned over and the string represented on the opposite side from that on which the ball was drawn, and of a different color. *Red* was the favorite color, *vermilion red*. (No dictation as to color was allowed.) My experience with my own babies has been that an outline of an object is fully as satisfactory as the most finished drawing. These were all children who had been in kindergarten only a few days.

L. I. Vance, in describing the evolution of dancing, says volk-dancing is the oldest of arts as music is the youngest. Out of old rural songs and local culture dances, known as mysteries and festivals, grew the marvelous structure of Greek drama. Æschylus and Sophocles were clever dancers, who led the chorus. Religious dances are arranged by medicine-men. Dancing and religion are inseperable among savages. In mystic dances an inexact step may cause death. The savage is great on fierce initiations. Dancers endure extreme cold and mutilation. There are dances for men only and for women only, where intruders of the other sex are killed, and certain things are known only to those initiated into a particular dance. Revealers of mysteries dance them out. The orgiastic impulse is always breaking through civilization. If swoon supervenes, it is deemed spiritual commune. The passion of Dionysus causes girls to dance themselves to death. A young Cheyenne started the Messiah craze of 1890 by a trance, dreaming he had seen Christ and dancing fast and furiously. The Nautch girls, the whirling dervishes, May pole and French dances, the mystery plays, the dance of death, and others are instanced. Priests get power by leading dances. There still survive in the Corpus Christi dances in Seville, and choir boys dance before the Host every evening at five. It was slowly secularized. Elaborate figures, "women faces and waving hands" were later evolved.

The Open Window is a monthly journal now in its eighth volume, published in New York under the auspices of the "Shut-in Society," and intended for invalids. It is very religious in its tone, describes ideal journeys, contains much poetry, and is intended to stimulate patience, to relieve the weariness of the sick room by receiving and writing letters, arranges common daily and weekly hours of prayer. All members must be invalids, associate members need not be. Its tone is unique and seems a little artificial and strained, and suggests the prevalent note of the "King's Daughters."

The school superintendent of Salinas Co., Cal., Job Wood, Jr., has addressed a circular to his teachers, asking them to use a spell-

ing or composition hour in having the children write answer to the questions: What is a knife, bread, doll, water, armchair, hat, garden, piece of sugar, thread, horse, table, mamma, potatoes, bottle, flower, snail, mouth, lamp, bird, dog, carriage, pencil, earthworm, shoes, finger, clock, house, wolf, omnibus, balloon, village, box, handkerchief?

These thirty-three words must be given with no directions whatever. The children must not be asked to *define* the words, nor must they be told how their answers are to be used. The papers are not to be considered from the point of view of spelling or grammar, and all must be spontaneous and off-hand. Professor Barnes' department at the Stanford University is to work over the returns to see if they shed light on science work in other studies. The returns will be awaited with interest.

Professor Guthrie says universities were first founded for the purpose of understanding the great minds of antiquity. Then later arose the dreadful school of dogmatic grammarians and pseudo-philologists. The frightful outcome of all this was that for a time information took the place of knowledge and the culture of the university was little beyond that of the cabman, postman, or at best the librarian. The grandest revelation ever made to man took place in the last quarter of the last century and the first half of the present, when chemistry, physics and biology were developed. These movements owed little to the universities in England at first. He sees hope in teaching science to children as follows: Twenty dollars will buy all the stuffs and things used to build a house, and all the inner furnishing, equipment and uses. First, coal, ashes, cinders and coke are described and illustrated; then concrete is made of lime, pebbles and gravel, with lessons on each process and object; combustion, clay, brick-making, tiles, drains, chimney-pots, slate, marble and other stones, tin, zinc, copper, mercury and their derivatives; also glass, glue, whitewash, litharge and putty. All must be seen and handled. All possible processes shown are done, and cuts of furnaces, etc. All generalization is avoided till there is something to generalize about. This will be irresistible, and then the awful story of the elements can come. Then come air, combustion, flame, water. Now the pupil is no longer a savage, but can really understand something about stuffs. Then heating and lighting the house, matches; then papering, painting and furnishing include the manufacture of cotton, hemp, cane, carpets, mirrors, pottery, porcelain, etc., etc. Then come food, washing, writing, reading, including skin, needles, pins, combs, and the five B's of food—bread, butter, beef, bees and bacon,—and milk, cheese, eggs, etc. Bread should be an epic of all the processes of wheat, infinitely more edifying than the sulks of Achilles and the roaming of pious Æneas, "the torture of Dante's 'Inferno,' the childish imagery of Milton," etc. As well preach cannibalism and that the proper nourishment of mankind is man. Next should come soap, soda, sponge, vitriol, emery, and lastly, book making, pens, inks, pencils, type, etc.

Professor Kimbal of Amherst says no student can work well with a sub-conscious feeling that he is absorbed in what is after all trifling. The great function of a university is to foster the spirit of high ideals, to hold up a high standard of intellectual life, to encourage the pursuit of truth for truth's sake, and without thought of immediate gain. As Faraday said to Tyndall, "There is nothing so prolific of utilities as abstractions." He was watching in his

laboratory to see if a current of electricity flowing in a coil of wire will start another current in another coil placed near it. At first he saw no result, but on stopping the current the needle of the galvanometer moved. What a waste of time, says one. But in that moment was born the age of electricity, and man was also given a nobler and more complete view of the universe.

Maxwell was a quiet, silent man, who left many papers of mathematical formulæ, unintelligible to any but expert mathematicians. But they contain a vast new truth, which will soon become as familiar to every intelligent person as the idea of the conservation of energy. It was these powerful mathematical processes which demonstrated what experiment has since proved, that light and electricity are equally related to the ether, that waves of electrical disturbance have the same velocity as light waves, are motions of the same medium, and that light and electricity are identical. The new unity of nature lifts and clears our thoughts, and the whole horizon of truth is widened. Man has more confidence in himself, and the spirit which seeks truth for its own sake is of prime importance for culture and utility alike. The moral to young men is that every addition to the sum of knowledge is worth making, but that new facts are not equally valuable, and work must be put in where it will be felt.

In his memorial on a national university, John W. Hoyt urges, in 123 pages, that some of the functions of a true university are nowhere fulfilled in this country and can only be exercised by a great university at Washington. These functions are "the completement of an American system of public education; the co-ordination and highest development of the schools of the states and the most effectual cultivation of the patriotic sentiment in the minds of those certain to be potential in the direction of our national affairs." The pamphlet is largely devoted to quotations from scores of persons, from George Washington to the present time, who have favored such a scheme. It is convenient, but adds little to the knowledge of those interested in the subject.

Mr. Froude, in his inaugural lecture at Oxford, compares himself to Epimenides after his forty-five years' sleep. Men, tendencies, ideals and methods have changed. Modern history, since the barbarian invasions, is 1000 years of events piled on events, with no visible coherence or purpose, wherein students may wander a life time as in a forest and never meet. The only law it teaches is that right and wrong are real distinctions, though historians may assume any purpose and find evidence for it. It is wrong that tendencies and species are all and individuals nothing. Take away the personal individuality of great men and the species element left is little. Just now we hear less of the science of history, but it is commonly assumed that there is progress, but from what to what? Aristotle says that in progressive democracies virtue ceases to be a prime object. It is hard and slow to get, at best. The best state of things is that which produces not the most knowledge or wealth, but men of noblest natures. Has there been progress here? Would the best now, if he met Socrates, St. Paul or Cicero, feel any great superiority? The masses are not better fed, clothed or housed than formerly. There was deep loyalty of service paid for by protection between lords and vassals, and the former led very plain, industrious lives in the middle ages and sat at the same table. Political is as doubtful as social progress. Our ideal is that each be free to act and speak as he will, provided only he does not interfere

with the same right in others. It is true that authority, like all organized things, has decayed. But what shall we do with liberty, having got it? To be free in the days of guilds meant to have learned all that the master could teach. Why not thus in life, the art of arts? Now the most impotent of control are those who need it most. Liberty does not magically change character, as faith is said to, and the Revolution did not improve France. An aristocracy may have power or luxury, but never both; for this monopolizes the sweets of life and leaves the bitter only to the poor. For 200 years the highest duty of man seemed to rescue the holy sepulchre. So universal emancipation is a generous ideal decorated with flowers of rhetoric. The entire theory of political progress is without interest. Liberty does not raise character nor produce the only true progress, which is moral. Of governments, whatever form is best administered is best. All history is mythic, and indeed all knowledge, for each contributes a subjective element. The noblest language of one century may be trodden into cant the next. The ages cannot understand each other. The miracles of Catholic hagiology are neither true nor false to us. Recent popular historians take the side of distinguished sufferers. Fiction strikes boldly and its lance has a barbed point, while truth is moderate and hesitating. The historians should not scatter epithets of praise and blame, but truly delineate the great characters, like Hamlet, and let critics dispute about them. They should not be drawn as Raphael painted the apostles. We used to learn Greek history from Herodotus and Thucydides, Roman from Livy and Tacitus, and philosophy from Aristotle. These are radical. In English history the only sources as radical are Statutes and Rolls of Parliament. In his own twenty years' work here, Froude made these the authoritative bony structure and neglected modern historians. "Like St. Paul, I labored more abundantly than they all. Like St. Paul, I say also I speak as a fool." Tens of thousands of private letters, secret documents and cipher keys, often opened first after centuries, and in the most abominable handwriting. Finally, he says, he can work in no new harness, can teach no philosophy of history, for he has none, and knows and cares nothing for so-called laws of development. History is only a stage where the drama of humanity is played, mostly by great men.

THE PEDAGOGICAL SEMINARY.

AN INTERNATIONAL RECORD OF EDUCATIONAL LITERATURE, INSTITUTIONS AND PROGRESS.

EDITED BY G. STANLEY HALL, Ph. D., LL. D.

(President of Clark University and Temporary Professor of Psychology),
And the Members of the Department of Pedagogy in the University.

This Journal contains the following departments:

I. *Original Articles;* of which the following is a partial list.

The Study of Infants, by G. Stanley Hall.
The Contents of Children's Minds on Entering School, by G. Stanley Hall.
The Moral and Religious Training of Children, by G. Stanley Hall.
Children's Lies, statistically classified, by G. Stanley Hall.
Study of Children in the Worcester Normal School, by W. H. Burnham.
Anthropological Investigations in Schools, by F. Boas.
The Study of Adolescence, by W. H. Burnham.
The New German School, by W. H. Burnham.
Recent University Reforms in Europe, and Needed Reforms in this Country, Editorial, by G. Stanley Hall.
Educational Reforms, Editorial, by G. Stanley Hall.
Higher Pedagogical Seminaries in Germany, by W. H. Burnham.
Teacher's Training in England, by J. F. Reigart.
History of Methods in Geography, by J. R. Potter.
Vacation Courses in German Universities, by Leighton Witmer.
Outlines of School Hygiene, by W. H. Burnham.
Moral Education and Will Training, by G. Stanley Hall.
A National Physical Laboratory, by A. G. Webster.
Fatigue, by F. B. Dresslar.
The Individuality of Numbers, by Margaret C. Whiting.
Education as a Science, by E. W. Scripture.
A Sketch of Old School Houses, by F. B. Dresslar.
A Scheme of Classification for Child-Study, by W. H. Burnham.
Feelings and Ideas of Sex in Children, by Prof. Earl Barnes.
Individual Differences in the Imagination of Children, by W. H. Burnham.
Physical Education of Woman, by Prof. A. Mosso.
Mirror Writing and Left-Handedness.
The New Ethical Religious Movement in France.

No original articles are admitted unless the writer has *first* availed himself of the best literature upon his subject, whether in English or

other languages, and *second* has made some inference or contribution believed to be new, or useful. It is thus sought to apply in this field the same standards and criteria as are required by all the best *Archives* and other publications devoted to original articles in the field of pure or applied science.

II. *Literature and Institutions;* to which from one-half to three-fourths of each number is devoted. No labor or expense is spared to procure promptly all important home and foreign publications, whether books, pamphlets, reports or articles in educational and other journals. All the best of these are promptly epitomized and digested. This part of the Journal is thus at once a Review of Reviews and a Year Book.

The SEMINARY strives to make each of these reports a perfect miniature of the original, embodying its every new and salient phrase and idea, but boiled down to the utmost consistency. This work is usually so poorly done, that the services it may render are little known. These digests should be more striking than the original itself, where transitions are more gradual, and the whole not seen in all its proportions at once. It should make the original unnecessary, save for special purposes, and for these it should serve as a competent guide and finder. Educational literature is very widely scattered and found sometimes even in medical, anthropological and popular publications. Most of this large body of information is new and has not been accessible before to American teachers or in English. This very copious material is often comprehensively summarized in editorial articles in a way to bring out its salient points and its lessons. It is also grouped (and will be indexed and cross indexed) under countries, and again under grades of educational work, and again under classes of institution, such as medical, theological, legal, technical, normal, psychological, etc., etc., that thus all the resources of the Journal upon any given subject may be readily utilized.

III. *Notes, Miscellanies and Minor Reviews.*

IV. Descriptions of the carefully chosen Illustrative School Apparatus, Charts, etc., in the Pedagogical Department of Clark University.

THE SEMINARY thus attempts this hardest, most expensive and unremunerative work in the belief that it is the chief need in the present distracted, isolated and disjointed state of both higher and lower education in this country. It addresses the few and not the many, and it is hoped may serve the needs and interests of the following classes:

I. Administrators, especially university and college presidents, and state and city superintendents, who with their great responsibilities often lack time to seek original sources of information.

II. Educational donors, trustees, editors and other men of affairs who take an intelligent interest in education and would see the best methods of business and common sense applied in this field.

III. Professors of pedagogy and principals and teachers in normal schools, who rarely read foreign languages well or have access to the literature they would most profit by.

IV. The professors and students in the Educational Department of Clark University, in the scheme of work of which this Journal has a special part.

No other publication in English occupies this field or works by this plan, so that the PEDAGOGICAL SEMINARY is unique and has no competitors in its line. Its growth has been uninterrupted from the first. It has already proven itself indispensable to each of the above classes, and to none more than to those busy men in administrative positions in education who still feel the need of keeping abreast with all that is latest and best in all lands and languages, and avoiding with all diligence the second best, and who, for the discharge of their official duties, find it increasingly needful to utilize other lands as experiment stations and to profit by their experiences of error or success. It has shown itself, also, more and more helpful to those preparing special reports, lectures or addresses, and who wish to refer at once to all the best recent literature conveniently classified for this purpose.

No. II. is largely devoted to child study, and attempts to present all that has been done in that field. No. III. is largely devoted to universities and to educational buildings. Each number can be had separately, and liberal terms are made for Institute work to which No. II. is especially adapted.

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J. H. ORPHA, *Publisher*,

WORCESTER, MASS.

PRESS NOTICES.

It marks an era in the professional literature of the country . . . . Each number is a volume in itself, and is of inestimable value.—*Journal of Education.*

The *Seminary* seeks its readers in the higher ranks of education, and finds its appropriate home at Clark University, where the science of pedagogics receives such large attention and in the hands of so eminent a scholar and teacher in that department as Dr. Hall. . . . . The second number of the first volume of this remarkable magazine deserves more than a newspaper paragraph, and more than a casual reading . . . . and should be most carefully read, not only by teachers, but by parents, since the entire number is devoted to the "nature and needs of childhood."—*Christian Union.*

No work of any kind that we have ever seen indicated a clearer idea of the thing to be done or greater ability to do it well. To our mind no work that President Hall has yet done stamps his genius more fully than this, which indicates the immense influence that Clark University is to exert through the *Pedagogical Seminary* on the education of this country and indeed of the world. It embodies in itself and gives to the world the result of the work of what must already be one of the foremost if not absolutely the foremost Pedagogical Seminary in existence.—*The Teacher.*

An epoch-making event in the development of American education. . . . . Opens the new era in pedagogy for which the time is fully ripe and to which thoughtful students of education are looking with anxious expectations. It was reserved for President G. Stanley Hall and for Clark University to turn over at last in scientific pedagogy, the new leaf. In the *Pedagogical Seminary* we have something veritably fresh and full of promise. In the editorial we note with profoundest interest the writer's self-abandonment and self-surrender to his theme —a sincerity of faith and a glow of conviction unknown of late years in educational writing. As a perfect specimen of special exposition in the scientific spirit, it is simple and intelligible, genuinely kindling in its effect, wonderful in its efficiency as a stimulus to the careful reading of the pages that are to follow. This country . . . . is breathing the new spirit and making ready for new things. . . . . Our great state and city officials must adopt the seminary spirit and become receptive. . . . . They must join hands with seminarists.—*The Academy.*

The editor of such a journal must be a man of rare attainments. He must have studied the philosophy and history of education to distinguish the new from the old, the fruitful from the barren; he must have travelled and studied on the spot the workings of national systems and institutions in order to appreciate the developments and changes that he is to chronicle. He must be a man of mark in the school-world to correspond on equal terms with the educational leaders in other countries. Dr. G. Stanley Hall combines these rare qualifications. He has studied philosophy in the land of philosophers. In travel he is the Ulysses of scholars, in applied psychology he has done original work. To this we may add a qualification that with English readers will carry more weight than any of the above, he has the art of putting things.—*London Journal of Education.*

We can only say that educational men who neglect to possess themselves of the *Pedagogical Seminary* will, in a very few years, find themselves groping and wandering while others walk securely in the light.—*American Journal of Education.*

Two names will hereafter be associated as the greatest among American educators—Horace Mann and G. Stanley Hall—each having done works entirely distinct and yet each supremely important.—*Professor Jerome Allen, Univ. of City of New York.*

This is the most important publication in existence on matters of education. —*Boston Herald.*

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It is a searching critical résumé of psychology as applied to educational processes; being edited by America's greatest pedagogical scholar, G. Stanley Hall, LL. D., president of Clark University. This magazine is of the highest value to all teachers and should be in every professional library.—*The Western.*

EDITORIAL.

This number of the PEDAGOGICAL SEMINARY, which completes Vol. II., and is devoted, like Vol. I. No. 2, largely to child-study, has progress to report.

Dr. West (p. 492 below) measured 3,250 children in Worcester, and Dr. Boas, who planned this work, extended it to six large cities. The latter's results have so far been shown only in diagrams at Chicago. Medical examinations are made in increasing numbers (p. 507 et seq.). W. E. Porter tries to establish a physical basis of precocity and dulness, by showing from measurements of 30,000 children that precocious children are heavier and dull children lighter than the average. Professor Bryan has published (*American Journal of Psychology*, Vol. V.) the most systematic study yet made of motor ability. He found the changes caused by fatigue greater than the improvement due to age, that a child of sixteen could tap, *e. g.*, five times as fast as one of six; that the rate of this motion declined at fourteen in boys, and at thirteen in girls, but was preceded by a rapid and followed by a less rapid increase. The power of making precise movements varies much more. The voluminous material collected by the Worcester Normal School is being sifted and grouped by an expert, Mr. Bolton, and the publication of it is begun in this number (pp. 343 and 358). Each instance as reported in Mr. Brown's protocol can be cited by subject and number by the future text-book maker, as theologians refer to chapter and verse of the Bible. The new little volume of Preyer translated in Dr. W. T. Harris' series, and the larger

one by Compayré, give a handy view of what is done in the study of infants.

After a crowded three days' meeting with a full programme on child-study last summer at Chicago, a national society was organized, which, it is hoped, may have an active representative, or better, a branch society in every city, and unite parents, teachers and physicians and others in collecting material. Pending the election of a new secretary and treasurer in place of Professor Bryan, the publisher of the SEMINARY, J. H. Orpha, has consented, with the coöperation of the instructors and advanced students in education in Clark University, to aid by personal correspondence any member of the society who wishes to undertake detailed work in any of the topics in the following syllabus:

A. PHYSICAL GROWTH. I. *Weighing.* This should be daily for a few months, then weekly, and kept up from birth to as near maturity as possible, with precaution as to uniform clothing, hours, etc. A single good record of this sort could be kept by any parent and would have great value. Running notes on any change in health, mode of life, etc., should be made.

II. *Measurements.* Sitting and standing height, greatest span of arms. If for an individual child, this should be at first weekly, then monthly. Breadth and thickness of skull and face, chest, growth of limbs and hands, etc., are harder and require some expert knowledge, especially in working up the results. [Correspondence offered as above.]

III. *Photography, Casts, etc.* A series of photographs of the head or body, or any part, if repeated at first monthly, then yearly, with all precautions as to uniform size, point of view, etc., would have great value. A leading worker here suggests such a series for a thaumatrope, to give a striking picture of growth, in *e. g.*, the face, which during the first few years expands so fast, from the mere sucking apparatus of a bulbous skull to an expression of character and perhaps beauty.

Growth is influenced by climate, locality, race, sex, age, mode of life, exercise, food, and almost all the conditions of modern life facilitate or retard it. The later stages of growth are easily prevented, so that many go through life dwarfed more or less in shoulders, chest, hips, arms, legs, digestive or circulating organs or function. Do eye, ear and different bodily organs or functions

have "nascent periods" and in the same order for all children? and is retarded growth always favorable to disease? To answer these and many other urgent questions needs more extended and careful measurement of hands, the aid of casts, and even of some of the methods of the Bertillon modes of identifying criminals. For a very hasty survey of the work done in this and other parts of the field, the writer takes the liberty of referring to an article in the *Forum*, December, 1893.

B. MOTOR TESTS. The importance of noting the vast difference in children in motor ability has grown with manual training and with the growing importance now assigned to will by the new psychology.

I. *General Tests.* (1) List favorite toys, what each means to the child and how used; (2) The same for games and pastimes; (3) Keep all spontaneous drawings (see PEDAGOGICAL SEMINARY, I. pp. 445-6); (4) What have the children ever made? how and why, etc.? (5) Sit or stand still in various attitudes, *e. g.*, naturally, hands over head, palms forward (a test for chorea), stand with toes and heels together and eyes shut (a test for paretic insensibility of feet), stretch out hands horizontally and spread fingers (for tremors), involuntary uncontrolled movements of all kinds.

II. *List of Special Abilities for Primary Grades.* Make a face; what does it look like? scowl; shut either eye alone; imitate any animal or person by look, sound, gesture, etc.; protrude tongue and move it up and down and sideways; roll the eyes; beat or step in time to music; stand on either foot, heels and toes; walk fifty feet straight with eyes closed; catch a ball ten feet away; skate; play leap-frog; roll hoop; spin top; snap marbles; thread a needle; follow a line in drawing; tap with each finger separately, on desk, with both hands, symmetrically and congruently; touch hands behind and fold them back of head; wind thread; drive a nail; tie two ends of a string; dress self completely, shoes, hair, etc.; pick up pins and pieces of smooth paper from the table; study individual modes of laughing and crying.

Powers develop before the ability to check their manifestation, so that children show many forms of motor disorders due to lack of control and coördination, just as in speech they show most symptoms of aphasia. More exact tests are the following:

III. *Strength.* Tests of maximum strength are made in most gymnasia, and all kinds of "records" are made and broken. The lift, pull, put, leap, spirometer power;—none of these have ever, that we know, been systematically carried up through the grades of school work, to ascertain how growth and strength correspond with size.

IV. *Rapidity.* No good tests of reaction-times have yet been made. The rapidity of a single movement, and the most rapid vibratory movements, whether of the tongue in saying t-k (Stevens), or of hand and foot, should be investigated with suitable apparatus.

V. *Exactness.* More definite tests than those above (II.) have been made by Bryan, who had children insert needles in holes of various sizes, and draw a point down as near as possible to the apex of a V without touching. Making the slightest possible movements with different parts of the body, which have led to suggestive results with adults, could be tried on children with very simple apparatus.

VI. *Fatigue* is so many sided a topic, and so important, that no careful set of observations could come amiss. We shall refer here only to Galton, Burgerstein, Dresslar, PEDAGOGICAL SEMINARY, II. pp. 60-102. More work on Burgerstein's lines is especially needed for its practical bearings.

VII. *Language.* Study Tracy, p. 493, and Garbini, p. 494, and construct complete vocabularies of every word and noise of a single infant. Of course the phonograph or even Bell's visible speech are possibilities. We want everything from the noises of infants, deaf mutes or idiots, up to errors in pronunciation, in writing, spelling, and grammar. Any teacher can easily make instructive lists of any one or all of these four latter.

C. TESTING THE SENSES. Very much work has been done on sight and hearing, digests of which have been printed in the PEDAGOGICAL SEMINARY (see especially II. 3, p. 397). Touch is least known and more knowledge of it is most needed. A scheme of work on it will be sent by an expert here to anyone wishing to investigate, or on the time-sense and the sense of rhythm, which are still less known. While many of these tests require apparatus and experts, there are many which any teacher can make.

D. HIGHER MENTAL FACULTIES. Contents of children's minds. Read PEDAGOGICAL SEMINARY, I. p. 139, and then select with great care a list of common objects, processes, abilities, with plenty of local color, and also with reference to the subject-matter of instruction during the first or other years of school work. Most of the work in object lessons, local geography and history, should be directly shaped by the results of such tests, as is now done in Annaberg, Germany, where much else is influenced by it. PEDAGOGICAL SEMINARY, I. p. 168. Again, each of the following topics is alone sufficient for a long and rich investigation: memory, imagination, association, power of attention, tests for ear and eye-mindedness,

visualization, imitation and suggestion, color and musical sense, ideas of sex and religion, collect reminiscences of earliest childhood, dreams, children's lies, falsehoods and evasions, *e. g.*, PEDAGOGICAL SEMINARY, I. p. 211; collections, I. p. 234; secret language, natural mirror script and vertical script. Get a number of children to write something. It may be anything from a word to a composition.

E. FEELINGS AND EMOTIONS. Special series of observations are needed on *each* of the following: love and hate, sensitiveness to pain and pleasure, and their manifestations and control; laughing and crying; anger, all its degrees and expressions; fear, shame, regret, pity; studies on temperaments, jealousy and rivalry.

F. GENERAL OBSERVATIONS. Most of the studies above require not only great limitations of the field, but some special method. The Russell method (read below, p. 348 et seq.) does not. Any act, truth, saying, or any salient expression of any psychic process, is simply noted without comment, but with the greatest accuracy. Any teacher or parent can do this. This work will surely tend to interest teachers in the individual child more than in the school machine, is related to more special work somewhat as the studies of a general naturalist are related to more specialized modern studies in histology and embryology. It is first of all for the teacher, and must beget both love of children and tact in education, or a desire to do more special work.

G. DEFECTIVE AND EXCEPTIONAL CHILDREN. For superior children collect fifty or one hundred of the best biographies of the "greatest men" and women, and collate modes of education and growth. Describe very fully a case of precocity or dullness. Each teacher has at least one peculiar child which must be studied or left uncontrolled. Of course only the genius of a Dr. Howe or Seguin can get back and down into the soul of the idiotic, blind or criminal child, but sympathy and tact are very roots of genius. Special literature, methods and advisers for this work are ready to aid applicants. Workers in homes, refuges and reformatory schools, etc., are especially wanted.

H. MISCELLANEOUS. Describe special favorite articles, books or stories found to have special interest for children, with detail as to use, or about children, whether in prose or poetry, fact or fiction, or showing the unnatural phantom child of much juvenile literature, not excluding medical and anthropological literature. Describe any favorite toys, games, recreations, amusements, dramas, music, from kindergarten to college, or long or concerted plays, PEDAGOGICAL SEMINARY, I. pp. 229-237; any peculiarities of sleep, adolescence, I. pp. 174-196; II. p. 494; any natural spontaneous singing (words

and music) of children; any indications of morbidity of any degree of mind or body; any marked effect of extreme parental severity or laxity and indulgence; result of unwise religious teaching; of physical defect or malformation; describe in detail petty habits often evanescent, such as snuffling, spitting, winking, slang, fads; note any cases of voluntary infliction of pain, moral or physical, upon self, others or animals, or cases of exceptional altruism or selfishness; any radical changes of habits, powers and marked reaction to the personality of adults; illustrations of the sense of justice and fair play, *e. g.*, moot courts, umpires, rules of games, causes of popularity and unpopularity, coquetting, mashes, falling in love, love of scenery, causes and manifestations, conscience cases, effect of twilight, bed-time, etc., punishments, etc., self-consciousness and shyness, sense of humor and what stimulates it, child superstition, ideas of medicine.

The above list of points shows first of all that no single observer can cover the whole field. The vague general schemes and questions so often circulated of late, have not only yielded no single result or paper of value, but have done the cause great harm. The method *F* is the true and only method for this general work. It is in a sense introductory and should be extended as a first stage as widely as possible, and no more special or expert observer should fail to keep an eye toward all parts of the field, and note everything of interest. This gives not only perspective, but suggestion and zest for more advanced detailed work where conditions must be controlled and more complex methods and apparatus used, besides furnishing a valuable protocol of new results for ulterior expert elaboration.

It can be distinctly said now that work will be likely to have scientific value in exactly inverse ratio to its scope. Instead of filling out inane circulars, let each teacher or parent who wishes to join us and attempt work, select after careful examination of this list one or more topics, get into correspondence, through Mr. Orpha, with the expert on that group of topics, who will first indicate what should be read, to know what has been done, and then suggest details of method to each inquirer.

A few general injunctions are all that is needed here. Do not try to carry much machinery of local organization, or expect

to develop any great general interest. At best this would tend to arouse too great expectations, and is not needed, besides it is not "promoters" or propagandists of a "cause" that are wanted, but effective scientific work, which is far harder. Go quietly to work yourself; lead, not point the way. Say nothing, and thus allow interest and curiosity a chance to develop. By and by some parent or teacher will wish to coöperate, and if you get three or four in a large city the first year, it will be enough. They will keep each other warm more than a thousand patrons or on-lookers who are merely interested. The only interest worth having is spontaneous. You will gradually find that the few *best* teachers and parents, those who really love children, will respond first.

Do not attempt it unless you are sure you have health, strength and time enough without neglect of present duties, and unless you love the work.

No hack or routine teacher will ever undertake this work, but all of them are sure to discourage it. If you begin keep in communication with your advisers, get all the aid he or she can give you, and try to mature your work into a paper, ever so brief and modest, to print or read in a teachers' meeting, and when you are quite done with it, send it in to the secretary for collation and perhaps further use. Even in the most difficult parts of the field, you may be able to collect material to be worked up by scientific experts.

Out of it all you are sure to get great practical benefit and to increase the value of your work. Even if no results for science come from it, you are sure to be aided yourself, and do not forget that many of these studies—though by no means all—are "primarily for the sake of the teachers, secondly for the children, and incidentally for the sake of science."

Finally, do not take a subject on which you do no reading. On some there is little to read, and on others much, but, however small and special the theme of your investigation, you should do at least some general reading in related parts of the field. If, *e. g.*, you study touch, you should know something of the other senses, *C*; if you study drawing, or incipient chorea, or fatigue, you should read a little on the

motor powers generally, *B.* Of every child you register any fact whatever, never forget to note age, sex, nationality at least, if not complexion, temperament, and any other salient points.

THE STUDY OF CHILDREN AT THE STATE NORMAL SCHOOL, WORCESTER, MASS.

By E. Harlow Russell,
Principal of the School.

For about eight years, or since 1885, there has been in use in this school a method of studying psychology, supplementary to the systematic outlines of that science as usually taught in normal schools, by means of direct observation of children on a somewhat extensive scale. As introductory to the group of students' reports or records, classified by my associate, Mr. Brown, that appear in the present number of this review, the following brief history and description of the method employed is offered for the information of those who may be interested in this line of study.

I desire in the first place to acknowledge my great indebtedness to the editor of the Seminary, not only for the first suggestion of the desirableness and feasibility of the undertaking, but for helpful and stimulating criticisms and encouragements generously scattered along throughout its entire progress.

The whole thing is in principle exceedingly simple, and carries itself along in practice about as easily as water runs down hill. Our pupils take to it from the first, and though entirely voluntary and optional, it is the most nearly self-sustaining exercise in the school. This is mainly due, no doubt, to the intrinsic interest of the subject; but there has also been constant effort to avoid the embarrassment of too many preliminary directions and limitations, and to welcome and make the most of all contributions. There are no complicated blanks to be filled out; all that is required as a heading to the half-sheets of note paper furnished for the records is the name and age (and for convenience, the post-office address) of the observer; the name (or initials) of the child observed, its age, sex, and nationality; and the length of time between making the observation and recording it.

We begin, with new comers, by calling their attention to the fact that children are in full activity all about them, and to the

further fact that their own childhood stretches back continuously to infantile unconsciousness, and that parts of it may by practice in recollection be brought distinctly into view and studied, as it were, objectively. These two considerations, though obvious and familiar to all, need to be brought home to the mind with considerable fresh illustration, amplification and emphasis. Then, perhaps, the students are asked to recall some small incident of their own early life, or some act or remark of any child they have recently seen, and state with precision and without explanation or comment the fact so recalled or observed. This little lesson shows them that what is wanted is not only possible, but easy. As a third step, they may be requested to notice what the next child they happen to meet is saying or doing, and to make as soon as practicable afterwards a concise and accurate written record of this. The three steps just enumerated really sum up and epitomize the whole process. They are the unit of the exercise, and all else is only a repetition or multiple of this, with minor variations to suit circumstances. Our first experiments lacked simplicity and directness, and were encumbered with unnecessary divisions, explanations and cautions. The observers were over-equipped, as with sub-marine armor, and were lowered down heavily to their work, instead of being encouraged, as later, to take an easy plunge as occasion presented. The selection of significant phenomena for observation, the grasp of salient points, the apprehension of relations and accessories —these may be trusted to come later; but the central faith that the game you are after abounds in the woods, and the confidence that you have the eye to discover and the hand to capture it—this is essential and for a time is sufficient. Criticism of matter or manner plays but a minor part in the treatment of young observers; everything is accepted thankfully, but it is understood that the highest premium is put upon fresh, living facts, whether in themselves important or unimportant, observed and reported with the precision and impartiality of a photographic camera.

It is a characteristic feature of our practice that we do not limit the field of observation, by proposing definite points to be investigated, or even marking out special lines of inquiry. A determinate course and method, such as would suggest themselves to a scientific man as most likely to lead to the results desired, would often take our youthful and comparatively untrained students quite beyond their depth. They are by no means competent to do exhaustive or "quantitative" work in experimental psychology, and such work is not attempted. Amateurish fooling with the Ulysses bow of scientific investigation, technically so called, receives no encouragement here.

Nor are our students led to concern themselves with the inferences which their facts might yield, still less with the broader generalizations that masses of such facts may ultimately establish. They are taught rather to regard their undertaking as of the nature of an exploring expedition among the phenomena of child-life, and themselves as nothing more than faithful collectors of specimens which as the raw material of science may be worked up by experts later. We made the mistake, as above hinted, of beginning in a somewhat more ambitious way, that is, with more definite and restricted aims and with the hope of reaching certain conclusions; but the results recorded at that time are meagre and unsatisfactory, and the method was soon enlarged in scope so as to give our observers greater freedom and occupy them with what they could do instead of what they could not. For instance, children were much questioned at first upon a great variety of topics, and their answers carefully recorded. But it was soon found that these answers possessed little value, because the children by the very act of being questioned by adults were thrown out of their natural mental equilibrium and they reacted upon the questions with replies that were more or less mechanical, fictitious, self-conscious, or otherwise distorted. It was like studying the nature of a wild animal by observing its behavior in captivity. "In trying to find out the phenomena of life, we may by our method arrest the very phenomena we are in search of." We must, therefore, if possible, see the child in its native haunts, about its accustomed business and undisturbed by any sense of being the object of special attention. Instead of breaking in upon the child's play in order to ask him a string of questions of your own devising, why not draw near quietly and watch the play itself? You may be pretty sure he is already doing more to reveal his real nature than you can lead him to do by any interference. His spontaneous actions are his native language. Why not learn to read that, instead of trying to get him to express himself in yours, which is to him a foreign tongue? Thus we came to abandon in large measure formal questioning, and along with it most of the seeking, prying and testing that had been first attempted. We fell back upon the device known to sportsmen as the "still hunt." We began to approach our game obliquely and under cover. The observer learned to efface himself and conceal his purpose, to keep the note-book and pencil out of sight and feign preoccupation, watching the child, as it were, out of the side of the eye. This way has proved not only more effective in bringing into view the real nature of child-activity, but it operates powerfully to open the mind of the observer. The child is no longer held and searched, so to speak, for some

quality that he is suspected of having in his possession. Instead of looking for this or that particular thing, with a certain degree of blindness to everything else, there is now a greater readiness to see anything that may appear. The attention is not preoccupied, and there is room for a wide and alert expectancy to which nothing comes amiss. To try to see *what*, induces a better habit of observation, we find, than to try to see *whether*. Let me not be understood, however, as asserting or implying that it is impossible or unwise to use, in certain circumstances, methods more determinate than those which we have employed. Indeed, I am convinced that such are in successful operation elsewhere, as, for example, in investigations recently made by Professor Barnes. But our own experience has led us in a different direction, and with such results that we are at present disposed to hold to the more inclusive course as better adapted to the abilities of our observers, and perhaps in the long run not less serviceable to the end in view. While we thus decline to attempt researches, however urgent or inviting, which seem to demand the trained intelligence and rigorous methods of scientific experts, we find an inexhaustible field of work lying at a safe distance from any of the tracts pre-empted by another order of settlers. For if the science of psychology is to be established and advanced on the objective side, as has been done, for example, in the case of botany and geology, then there is need of vast masses of facts, which for their multitude can only be collected by an army of observers and investigators working in many quarters, under various conditions, and through a long period of time. The domain is of such wide extent that, as Froude says of history, "students may wander about it, as in some vast forest, and never meet." The ordinary every-day life of the children of any community offers thousands upon thousands of significant facts, open to everybody's notice, and ripe enough to be plucked and used as data for valuable generalization, but not yet disengaged and made available by explicit observation and record. It is the gathering of these, in great numbers, that constitutes the simple task of our students. They are to report everything they can get hold of that goes to make up the manifold activities of children's lives; and they are to reject nothing because it seems remote or trivial, for they can never tell at the moment what significance may lurk unperceived in the most ordinary or the most extraordinary word or act or gesture. Accordingly, they cast as large a net as possible and of as close a mesh, the object being "to gather of every kind;" the "haul" can be sorted by competent hands afterwards.

And this they do with an alacrity that is surprising. They "better the instruction." No one can peruse the thousands of records that have been handed in during the last five or six years without being struck with the wide areas of observation which these young people in the aggregate have traversed. As one reads score after score of their reports, many of which seem as vivid and striking as instantaneous photographs, the imagination easily pictures this band of alert and open-minded students, watching with unwearied patience or following with noiseless step the fascinating little creatures of their quest through many intricate and winding paths: at home, in the street, at school, at church; alone, with playmates, with strangers, with pets; in moods of fear, affection, anger, jealously, vanity, frankness, deceit; in all stages of knowledge, error, superstition and ignorance; in every display of ability and ingenuity, whether in devising or executing; in all phases of enjoyment, passive and active, especially in games and plays; in every indication of special talents or strong bias or of conscience: in every sad manifestation of deficiency, maladjustment or depravity; in the mysterious rhythms and modulations of thought and fancy and feeling — from all these highways and byways of children stores of facts have been gathered and brought home. Special mention must here be made of reminiscences, a form of report that often throws new light upon the inner and more secret workings of children's minds. The student, now grown up, turns back in memory to a period of her own childhood so far removed from the present that the contemplation of it may rather be called observation than introspection, and tells how the little predecessor of herself once talked and acted and with what thoughts and feelings she viewed her narrow world. Some of our pupils show great aptitude for this retrospective "observation," and are able to reveal the child's side of certain phases or passages of conduct which at the time were mysteries to parents and teachers, and could only be cleared up when the lapse of years allowed the close seal of childish secrecy to be broken. Here are a few specimens:

[*Series I., No. 6086. Reported at age of 19, after interval of 8 or 10 years.*]

"I used to think a great deal of a certain girl whom my mother did not think much of. This girl was not a nice girl. She told many falsehoods. I liked this girl so well that I often shielded her from shame by saying that I myself told her lies. I would take all the blame willingly, that my mother might like her as well as I did."

[*Series I., No. 6087. Reported at age 21, after interval of 6 to 15 years.*]

"As a rule, I preferred story books which were not illustrated. This was because the illustrations were not so beautiful as the pic-

tures which came into my mind while listening to or reading a story. I used to turn the pages over quickly, or if there was print above and below the picture, I used to hold my hand over the picture so that it could not blot out the one in my mind."

[*Series I., No. 6088. Reported at age 19, after interval of 9 years.*]

"I distinctly remember hiding, under a piazza, a doll which belonged to a child 4 or 5 years old. A girl of my own age helped me hide it, and as far as I know, it has remained a secret to this day. We hid the doll through no feeling of malice toward the owner, as far as I can remember."

[*Series I., No. 6089. Reported at age 19, after interval of 12 years.*]

"When I was seven years old my sister was two. We lived with my grandmother, who had a bedroom just out of the dining-room. In her room were a set of drawers which were kept in apple-pie order. It always amused me to look into them. One day I was left alone with my sister. I went into my grandmother's room, opened the two lower drawers, and emptied their contents onto the floor. When my folks came back, I told them my sister did it. I repeated this several times. I did not do it to amuse myself, but from a feeling of fooling the older ones. I did this until my sister could talk; then, of course, I had to stop it. I never told of this until sometime during the past year."

The foregoing outline presents, though inadequately, the nature and scope of the work which our students have done up to the present time.

As to the value for science that their contributions may possess, I am not disposed to make great claims, my estimate being in fact below that of several persons who have read considerable numbers of these reports, and whose judgment in such matters is much better than my own. No one, however, can prize the method more highly than I do, as a means of normal training, for its efficacy, which has been abundantly proved, in bringing our prospective teachers into the right attitude of mind towards children as children, not as mere material for the teacher's art. Something further will be said on this head later on. The facts recorded are, for the most part, relevant and trustworthy; a considerable proportion of them are shown in their natural relations, and their number is, comparatively speaking, very great, amounting now to more than nineteen thousand, and is increasing at the rate of some three thousand a year. There would seem, therefore, to be little room for doubt that they constitute a source of valuable material for enlarging and rectifying our present meagre knowledge of the nature of children. That the weight they carry, as evidence, is chiefly "qualitative" rather than "quantitative" in character is obvious. But it may be remarked that to know children "qualitatively" is a good deal more than any educationist (excepting, of course, the omniscient *a priori* theorist) can so far boast, so that aid even on this side will not be superfluous. It is something if a move-

ment in this direction can start new questions, even though it may not be able presently to answer them. It would be in the interest of sound pedagogy to disturb the complacency and conceit that have for so long incrusted and encysted the whole subject of child-psychology, and prevented the access of the elements of growth and development—namely, an inflow of living facts—which alone can nourish it into a science.

If it be questioned whether a scientific subject can be properly served by non-scientific observations, whether these would not necessarily be fragmentary, dismembered and mixed with error, the answer is that it depends upon what is undertaken. Within limits which would by no means exclude what might prove useful in a very high degree, observers of ordinary intelligence can certainly be relied on for facts. Many who cannot swim may be trusted to wade safely in shoal water. "A rare plant," says Professor Sedgwick [*Educational Review*, V. III., p. 249], "may be discovered as successfully and as triumphantly added to an herbarium by a beginner as by an expert;" and Huxley remarks, in the same vein, that "the way to science lies through common knowledge." I am anxious not to be misunderstood or misrepresented on this point. With science, if that term be used in strictness, we have nothing to do. Our work is as yet neither critical nor constructive, in the philosophic sense, but simply contributory. My only claim is that, as contributory, such work is not without scientific value. To illustrate this, let me give a few examples which may be taken as fairly representing the whole, not, of course, in scope, but in character.

[*Series I., No. 6241. Child observed, Joe, aged 7 years.*]

"Joe was standing at the sink drinking a glass of water. He had his back turned to the other people in the room. I heard him talking to himself and went nearer to him. He was making believe to be drinking in a saloon. He leaned up against the side of the sink, crossed his feet, and made some remarks about the quality of the drink which I could not hear. When he got through with the water, he put the glass on the shelf, and after paying the man, received back his change and left the sink, remarking, 'That's all right. I guess I'll be going now.'"

[*Series I., No. 6073. Child observed, Alfred, aged about 6 years.*]

"A. was dining at our home tonight. During dinner I told my father about the horse-chestnut tree one of the teachers [at the Normal School] saw, with red blossoms. My father said he never heard of a red blossom on a horse-chestnut tree before, and wanted to know what street it was on, when A. said, 'My teacher told us today of an apple tree and the blossoms on it were blue.'

I. 'Did your teacher tell you where it could be seen?'

A. 'Yes, but it's down on Winter street in Boston, so you can't see it.' My father said it would be worth while to go down to Boston to see such a tree, and he thought he could see it when he went on Wednesday, as he knew what street it was on.

"A. did not say anything for quite a while, and then he suddenly said, 'I forgot to tell you a storm knocked all the blossoms off that apple tree, so I don't think you can see it.'"

[*Series I., No. 6152. Child observed, Charlie, aged 5 years, 8 months.*]

"One evening some chickens had been killed and Charlie was sent into an outer room to bring one in which was all picked and dressed. He had been gone only a moment when we heard him screaming as if in the greatest terror. Some one ran out to see what was the matter, and found him very pale, crouching against a table, and a little live chicken standing in the open door. After questioning him a long time, we finally discovered that why he was afraid was because he thought the chicken which he had been sent for had come back to life again and was the one standing in the doorway. He is usually not at all afraid of anything."

[*Series I., No. 6153. Child observed, Hildur, aged 1 year, 7 months.*]

"Just after Mrs. L. had brought Hildur in, I accidentally knocked a chair down on the floor. Hildur began to cry, and when I called her, she did not move. I went towards her, at the same time picking up the chair. She stopped crying as soon as the chair had been picked up. About ten minutes later, I put a chair down on the floor, and as soon as she saw it, she began to cry, and when I picked it up, she stopped."

[*Series I., No. 6108. Child observed, Anna, aged about 4 1-2 years.*]

"During a year before Anna went to school, Albert, who lived on the same street, used to go to her house, and they played together without quarreling and seemed to enjoy each other's company. Anna frequently quarreled with girl playmates, but never with him. On stormy days, if he did not come, she would fret and talk about him, and seem dissatisfied to play with her brothers and sister."

[*Series I., No. 6107. Child observed, Henry, aged 7 years.*]

"Henry told me confidentially that Alice —— was 'awful smart' and the 'best reader in school.' Winnie (10 years) overheard this and asked him if he liked Alice better than any other girl. He grew red, and was so confused that he did not answer."

[*Series I., No. 6081. Child observed, Stella, aged 9 years.*]

"Last night my sister woke up and said to me, 'Where did I drop it?'

I. 'Drop what?'

Stella. 'My bird; give it to me.'

"The cat killed her bird four months ago."

[*Series I., No. 6077. Child observed, A., boy, aged 6 years, 1 month.*]

"I watched A. going from one side of the table to the front of it and back to the side of it again, as if playing peek-a-boo with some one. Afterwards he remarked, 'This table is first long and then short.'"

[*Series I., No. 6075. Child observed, J., boy, aged about 7 years.*]

"J. was kept after school. He was very angry, and said in a threatening way, 'If you don't let me go home, I will take my knife and kill you. I have knives all over my clothes. My pockets are full of them.' He had no knife about him."

[*Series I., 6074. Child observed, M., girl, aged 4 years.*]

"M. had a large wax doll given to her. Many remaked to her that her doll was bigger than herself. She didn't seem to like this. One day her aunt was praising the doll's size and beauty and comparing it with its owner's. The little girl snatched up the doll, went into the next room, and, taking her little flatiron, smashed the head, arms and legs, saying, when she finished, 'That doll won't be bigger than me any more!'"

Now, in the language of Ribot [*English Psychology*, N. Y., 1874, p. 33], "no doubt all this is not a science, but without all this, there is no science." These examples detach and exhibit characteristic traits of children, and they do it with a firm and skillful touch. Their value to the psychologist is in no wise impaired by the medium through which they have passed in being observed and recorded. No amount of scientific training in the observer could improve the result so far as it goes. As material, it is ready for any process or manipulation that may await it in the next stage on its way towards the highest generalizations which it may be capable of yielding. It is out of just such accumulations that all the sciences which depend on observation have been slowly built up, and without immense masses of facts like these, as Ribot says, inductive science is not possible. With such materials as have here been shown, augmented to any extent desired, it would seem conceivable that one might construct at least the foundations and frame-work of a psychology of childhood far more accurate and adequate than anything we now possess. This may take as long, perhaps, as to build a cathedral, and it may require the genius of a Christopher Wren or a Michel Angelo in psychology to give it final form and finish. That need not concern us if we are only getting our blocks from the right quarry.

But from another and perhaps juster point of view, it may be said that no experimental science, psychology, perhaps, least of all, can ever attain to more than provisional completeness. Even Darwin, with his almost unparalleled reserve and thoroughness, was not able to place his great doctrine beyond the reach of speedy mutations and readjustments. Students of psychology are peculiarly exposed to temptation in the direction of hasty generalization, because their task is to rebuild from the very foundations an edifice which was thought (and is still thought by many) to have been finished ages ago. A few surviving elders among us remember the mortification and reluctance with which we loosened our early clutch upon the pseudo-science of phrenology and fell back to traverse with slow and painful steps the ground of cerebral localization, which we fondly supposed had been cleared by Gall and Spurzheim almost at a bound. The history of

phrenology seems likely to repeat itself on a larger scale in psychology. The sense of this, as of time lost, haunts us and tends to quicken our pace and urge us on to conclusions; the more so as pedagogy stands with outstretched hand eager to seize and apply every latest generalization. Urgent questions beset us on every side, generating currents of inquiry of such force as to draw after them many premature answers. There is thus constant danger that the virus of hurry may infect our science, and of all the sciences none could suffer more from such baneful influence than that on which the art of teaching, and hence the welfare of future generations manifestly depends. If this great science is to be changed over from the deductive to the inductive side, and thus "fall into line in the great Baconian change of base," then we may be sure there is work cut out for more than one generation, and may we not bring the laugh of posterity upon us by spending time on the superstructure that ought to be devoted to driving piles for a firm and lasting foundation? I suggest these considerations partly in answer to numerous inquiries that have been made as to how soon the material we now have on hand is to be worked up and made available for students of pedagogy. The publication herewith made of a very small portion of our reports, and the likelihood that further instalments will follow, make a still fuller reply. But I must repeat that our work was not undertaken, and is not carried on, with any expectation of quick returns in the shape of principles fully established and verified. On the contrary, it was rather to open a way to much wider investigations than had yet been attempted. Its whole scope and method, as has been shown, are such as to postpone rather than hasten conclusions, and this feature is deliberately and confidently put forth as a recommendation of its character. It is expressed in the motto printed at the head of our blanks, a sentence from Darwin's autobiography: "I worked on true Baconian principles, and without any theory collected facts on a wholesale scale. . . . ." Reference to the PEDAGOGICAL SEMINARY, I. 2, pp. 221, 223, will show some of the uses to which the material has been put in this school. An expert psychologist, a fellow of Clark University, has devoted four months of continuous labor to the reports comprised under two or three rubrics, but the results are not yet ready for publication.

But finally, as has been said, the main impulse which sustains our undertaking comes not from a conviction of the direct service that it may be capable of rendering to science, but from witnessing its strong and wholesome influence upon all who engage in it. Not only is the pupil's attitude and bearing towards children radically changed, and changed, as

a rule, from wrong to right, but there is an awakening of intelligence and of new interest and zeal in the higher and finer parts of teaching that does not soon die out. Many students come to us with the narrow view of supplying themselves with a handful of cut-and-dried methods. Their idea of teaching is mostly confined to the presentation of certain prescribed subjects by a logical arrangement of topics, and a process, more mechanical than intellectual, of "developing" a few commonplace notions and statements relating thereto. To this is usually added some idea of "raising the standard" in their schools by various devices, among which classifying and "averaging" play a prominent part. Their attention is fixed upon the thing to be taught, and their test of results is the set examination. They have not bestowed a serious thought upon the principle that "learning depends on the learner;" they think learning depends on the teacher and the method. Their interest in children is as yet potential and latent. They regard them as material for their art to work upon, and want only such as are "good." Exceptions there are, of course, but the above description is not unfair to the majority of those who enter the Normal School, and I fear it is capable of still wider application. Now the training which such young people need is of quite another sort from that which they seek or even dream of. The very first step in the "professional" part of it should place them in a wholly different relation to children, a relation which combines two very dissimilar elements, namely, the maternal interest and the scientific interest. This change cannot be effected by precepts or lecturing, or by the study of systematic psychology. This last is mainly useful as the trellis is useful to the vine, to give support and orderly expansion to knowledge and experience gained at first hand. Professor Royce's view is quite to the purpose here: "First, then, let the young teacher remember that it is not the 'system' of a psychological science, not the exhaustive theory of the 'powers of the human mind' that he needs, but rather the psychological spirit: that is, the love and the skill that are required for the purposes of mental diagnosis.'" [*Educational Review*, I. No. 2, p. 124.]

To this end, there must be a quickening of the sympathetic imagination to such a degree as will put the young teacher habitually in the place of the learning child. She must become familiar with his point of view and his modes of thought and feeling; and further, she must abandon condescension and the missionary spirit, must forget that she is a teacher, must enter unreservedly and joyfully into the child's world, adopt his language, accept his ways, and learn to live intimately with him, and share on equal terms his aims and interests. This does not

come by wishing for it, however sincerely or ardently. It does not come by suffusing one's thoughts and words with sentimentality regarding children. Indeed it does not come to all on any terms. But given the precious germ, I have seen nothing so potent to quicken and develop it as the "disinterested interest" that is almost sure to arise from the daily study of children as individuals. It is not usually an exciting or intense interest, but it lasts well. It follows our graduates into their schools, as appears by evidence from several sources, especially the letters they write back to us, filled largely with accounts of their dealings with peculiar children. The following specimen paragraphs are taken almost at random from hundreds of like character:

[*From Miss C. P. A., May 8, 1892.*]

"K. did several things the other day which annoyed me. I was out of sorts; if I had not been I don't think I should have minded his little disorderly things. At last I said, 'There, you may stay after school.' He acted worse than ever after that. As the boys were marching down stairs I glanced in the room just in time to see him throw an eraser at another boy. After school I talked to him when every one had gone and we were all alone.

I. 'K., I don't like the way you acted this afternoon.'

He. 'Well, you were cross to me, and when you're cross I can't do well, and I don't care what I do.'

I. 'Was I cross?'

He. 'Yes'm, you was.'

I. 'Then I'll try to be pleasant tomorrow, and you try.'

'It was half-past four then, and I told him he might go. He said he didn't care about going; he just as soon stay with me, for all he did was play ball. So he stayed till five o'clock and walked home with Miss J. and me. The next day he was a good boy and he has been good ever since."

[*From Miss B. E. S., Nov. 4, 1892.*]

"I have the proverbial 'bad boy' of course. He is a smart lad of thirteen, who has been a trouble for generations of teachers. There is a great amount of good in the boy if I am only smart enough to get it out. He is fond of reading history, and is a champion among the boys in base ball. For the first three weeks I ignored his impudence, but at the end of that time I had a long talk with him, in which I told him that though I had not appeared to mind it, I had noticed all his saucy words and actions. I added that I had been waiting these three weeks to see if his gentlemanly instincts would not make him ashamed of himself, etc. He did not attempt any reply, and from that time he has behaved himself like a different boy. I feel that we are on the high road to success now. If I had been severe with him at first, as it seemed to me I must, I am pretty sure I would have driven him into being a bad boy."

[*From Miss S. K., Nov. 30, 1892.*]

"C. M., about eight years old, is a child whom we do not understand. She appears to be an average child in the lessons of the school, but her behavior is very strange. If we tell the school to do a certain thing, she will not do it until she is compelled to. She has a disagreeable way of watching us, as if to find out how far she can

go, as if she knew perfectly well she was in mischief. We are looking for a better way to manage her, as everything we do seems to bring out all the bad in her. She is a self-conscious child, and some of her antics are simply to attract attention to herself. The children imitate the teachers in ways which the teacher does not expect. One boy has learned the art of developing words. A child could not tell the word 'nest.' This boy asked him, 'What is it that the hen lays?' in such good faith and with such a reproduction of my own manner that it was irresistibly funny."

[*From Miss H. A. M., Oct. 23, 1892.*]

"I have forty-six children, mostly of foreign parentage, and for a time it seemed to me as if I should never be able to do much with them. Often I wondered if I had not better give up teaching and do something else, for I feared I should never be able to govern the school. Some of my boys seemed beyond my reach; they regarded me with suspicion whenever I approached a group of them and tried to talk with them, or else they nudged each other and grinned without answering. But with the compass out of doors, and the prism and tuning-fork indoors, I soon got them around me, and now they come to me and talk of things that interest them. I am often surprised and delighted at the frankness and simplicity they show in talking to me. We were talking the other day about lying, when F. raised his hand to tell me that whenever he told a lie he could feel his face growing hot. Then D., a little colored boy, said that while he was telling one he could hear his heart beating fast. And by the way, poor D.'s heart will be worn out while he is yet a boy if this is the case, for a more persistent little liar I never saw. It is in vain that I urge him to be a man and have the courage to own up when he has done wrong. This exhortation is pretty effectual with the most of the boys, and I like it so much better than telling them how wicked it is to lie. I don't believe the average child can see very deep sinfulness in it, but he *can* see that it is cowardly. I have two boys who, I feel pretty sure, do not swear, but the others all do. They own up to swearing 'sometimes,' but dear little Patsey says that he 'never swears in the house!' "

[*From Miss H. A. J., May 12, 1892.*]

"G. is a nervous six-year old boy. He is extremely slow to answer, although almost always correct. Whenever I call on him to answer a question he opens his mouth wide, looks steadily at me, twists his fingers into all kinds of shapes, and begins to tremble. At first he acted so very strangely that I seldom called on him, but whenever I did I gave him all the time he wanted to answer. His mother called on me about two weeks after school began. When she asked me how G. was getting along, I told her of his queer nervous manner. 'Pshaw!' said she, 'don't you wait a second for him. He can talk fast enough if he has a mind to. He always was the most obstinate child I ever knew, and if he don't mind you quicker than that, you just lick him. Why, I have to lick him nearly every day.' This was enough for me to know, and I am sure it must be his treatment at home that makes him so timid in school. This poor little fellow is tormented by all the other children. Sometime ago they all had wooden 'guns' (one of which I am going to send you). The children used G. for their target more often than anybody or anything else. Later they sharpened sticks of my kindling wood and called them 'spears.' These were thrust into poor G.; and now their bean-blowers are all pointed at him."

[*From Miss O. J. A., June, 1, 1892.*]

"I have a boy in my school who, I think, is quite a prodigy. He has interested me very much, and I feel sure that you would like to see him. He is about twelve years old, has had very little home training, and was at one time an inmate of a truant school. When he first came to my school, he looked like a tramp, but after repeated talks on cleanliness, he has somewhat improved. One morning during the singing lesson I called on D. to sing. He stood, but did not sing. I tried my very best to make him sing *sol* in the key of G. He looked at me very scornfully and said, 'I never could scream like that.' I did not know whether to be provoked or to pass it off laughingly. I said, 'Perhaps you can sing better than that.' 'No,' said he, 'but I can play like a cornet.' I did not for a minute imagine that he meant what he said, but I told him to do so. I was really spell-bound when I heard him. His imitation of the cornet was really wonderful. I let the children sing Auld Lang Syne, and he accompanied them. Since that day he is a changed boy. He comes to school regularly, and tries to keep himself tidy. The children look upon him as a great wonder, and repeatedly ask if D. can 'play' while they sing. I know that noticing this talent in him and helping to make some part of the school pleasant for him has made him a better boy."

[*From Miss D. B. E., Feb. 10, 1893.*]

"The snow drifts have been deep and the children are delighted to bury themselves in them, to roll big snow balls and make forts with them, and to slide and skate on their way to and from school. Some days they come in at recess covered with snow. I have stood in the doorway, broom in hand, brushing them off, till sometimes (not being a relative of Job's) I have been tempted to 'spank' them all. They enjoy rolling in the snow so much that I do not forbid their doing it. If you should see my children during these winter months you would not doubt in the least that 'activity is a law of childhood.' They seem to be 'into' everything. They receive the usual number of bumps and bruises and have toothaches and earaches, and the teacher is expected to offer her sympathy to the afflicted ones always. There have been so many calls for medical aid that I have made me an emergency box. In it I have an old pillow-case to strip up for bandages, soft linen cloths, needle and thread, cotton for earache and toothache (and tooth-picks and a small bottle of essence of cinnamon for the latter), also some cosmoline and court-plaster. I have had occasion to use every one of these appliances since I began teaching."

These letters are of little importance or interest for the facts communicated, but they reveal an attitude, a point of view, a spirit in the writers, which has for me the deepest significance. They show the teacher's attention and the resources of her art focused upon individual children instead of on the pedagogic phantom called The Child. They show rare apprehension and acceptance of the highest doctrines of Rousseau and his better known disciples, Richter, Pestalozzi, Froebel, and the rest. The clear vision of the individual, which leads to direct and rational rather than formal and traditional modes of influence and control, has a tendency to correct the excessive emphasis of generalization which normal students learn but

too soon and too well, and to restore to the young teacher a needed balance of common sense and personal sympathy. This not only increases skill, but strengthens and beautifies character. The conviction that this habit of mind is largely formed by such practice of child-study as has been set forth, contents me, for the present, to work on (in Dr. Burnham's terse phrase) "directly for the sake of the teachers, indirectly for the sake of the child, and incidentally for the sake of science."

SOME RECORDS OF THE THOUGHTS AND REASONINGS OF CHILDREN.

From the Collection of Observations at the State Normal School at Worcester, Mass.

By H. W. Brown.

The records presented in this paper are taken from the class, or rubric, to which are assigned (in the school where these records were made) such observations as indicate understanding, thought, judgment, reasoning, in children.

About five hundred records were read by me, not with the purpose of finding out whether they would lend themselves to any special theory or view, but with the desire to lend myself to any suggestion they might offer concerning the thoughts and reasonings of children. I have tried to treat them as the students who make the observations are advised to deal with the children they observe, viz., not to seek for some particular kind of mental activity, but to be on the watch for any that may be presented. Some of the records were found to be of little interest or significance, and those I threw aside as I read; the others, 375 in number, are herewith printed for the first time.

My reading soon disclosed the fact that a considerable number of the records showed the working of the child's mind in regard to words, and indicated misunderstanding of words used by older persons. Other records displayed a tendency to make application of sayings, texts, etc., to experiences. Others again furnished examples of the explanations that children make of phenomena. Then instances of false reasoning seemed numerous enough to form a class, and the same was the case with thoughts in regard to theological ideas. Accordingly, as I read, I laid apart papers that seemed to belong naturally to any one of the above classes, and they will be found here arranged under the following heads:

I. Misunderstandings of Words.
II. Applications of Sayings.
III. Explanations of Things.
IV. False Reasonings.
V. Thoughts and Reasonings about God, Christ, Heaven.

The remaining records are arranged simply in the order of the ages of the children observed.

These classes are by no means mutually exclusive, as they would be in a logical division; they overlap one another. A child's explanation is often an instance of false reasoning, and so on. The classification is merely a practical one of convenience.

For the purpose of this paper, it has not seemed worth while to note the nationality of the child observed. The sex, in almost every case, appears in the record through the use of the personal pronoun. The observers are mostly young women, from seventeen to twenty-one years of age. The age of the child observed is given in years and months.

RECORDS.

I.—MISUNDERSTANDINGS OF WORDS.

1. [3 yrs.] I said, "W., take your spoon in your right hand. Your other hand is your right hand." *W.* "Is this my wrong hand?" *I.* "No, that is your left hand." *W.* "If this is my right hand, that is my wrong hand." I did not succeed in making him understand why, if one hand was the right, the other wasn't the wrong.

2. [4 yrs. 6 mos.] F. was making words with her blocks. She put *w* and *e* down, and asked her mother what it spelled. Mrs. M. said, "we." *F.* "What can I make now?" *Mrs. M.* "Put a *t* after the *e*!" *F.* "What does that make?" *Mrs. M.* "Wet." *F.* "If I don't put *t* on it, it will be dry now, won't it?"

3. [6 yrs.] G. had been in the habit of saying, when anyone asked how much she loved them, "Oh, more than tun kin tell." One day she asked her mother what *tunkin* meant.

4. [7 yrs. 6 mos.] H. wrote his name with "master" prefixed to it. *J.* "What do you put 'master' before your name for?" *H.* "Because I'm master of something." *J.* "What?" *H.* "My dog."

5. [10 yrs.] When I was about ten years old, and I heard anyone speak of one person boarding with another, or at a certain place, I thought the person who was boarding was pounding with his fists against the walls of a room.

II.—APPLICATIONS OF SAYINGS.

6. [3 yrs.] J.'s mother was washing dishes at the sink, when J. put a chair by her and got up in it, trying to put his hands in the water. His mother turned quickly round to tell him to get down, for she had told him not to put his hands in the water, when he said, "Forbid them not, for of such is the kingdom of heaven." This verse had been taught him by his mother several days before.

7. [3 yrs.] P. was playing alone with his blocks. He was trying very hard to build a monument. He would get it built up to a certain height and down it would come. This time he got it beyond the limit of falling, and called for his mother to come and see it. His mother was busy at the time, so she told him to keep building and she would come pretty soon. P. added a few more blocks, and, to his surprise, one-third of it fell. He sat looking at it; his face was so sad, I pitied him. I heard him say in a low voice to himself, "The way of the transgressor is hard."

8. [3 yrs.] Sam gave a penny to his little sister. When asked why he did this, he said, in apparently good faith, "'Cause it's better to give than to receive."

9. [4 yrs.] D. had for a "Golden Text" Acts iii. 6. His little sister, W., was just learning to walk, and one day her mother told her to come to her. D. went to his sister, and, stooping down to help her up, said, "W., in the name of Jesus Christ of Nazareth, rise up and walk!"

10. [4 yrs.] One day Mrs. B., E.'s mother, was very tired and said, "I'm dead." E. said, "No you ain't, or else you must have rose the third day."

11. [4 yrs.] R.'s aunt said: "You are so restless, R., I can't hold you any longer." *R.* "Cast your burden on the Lord, Aunty K., and he will sustain you."

12. [4 yrs. 8 mos.] M. teased her mother to let her wash dishes. Mrs. K. got a box for her to stand on, and told her she might wash as many as she wanted to. When she had been at work a few minutes, she called her mother and said, "Mamma, I am washing these dishes for the Lord." Her mother asked her why she said that. She said, "My Sunday school teacher said if we helped our mothers, we would be working for the Lord. So I'm going to wash these dishes for Him."

13. [12 yrs.] *C.* "Papa, are you a rich man?" *Mr. W.* "Not in this world's goods." *C.* "Well, I think you are a lucky man, and you ought to be really thankful." *Mr. W.* "Thankful for not being rich? Why?" *C.* "Mr. A. [his teacher] read in the Bible this morning that a camel could go through the eye of a needle easier than a rich man can go to heaven, and I'm awful glad you ain't rich."

14. [12 yrs.] C. heard us telling that some one poured hot syrup into a bottle and broke the bottle. He did not see any connection between the heat of the syrup and the breakage of the bottle, and, in a few minutes, he said, "That was because she put new syrup into an old bottle, wasn't it, mamma?"

EXPLANATIONS OF THINGS.

15. [3 yrs.] P. went into the stable just before he was to go into the house for his morning nap. He asked the coachman if he was going to have Tom [the horse] go to bed because he was out all night driving with grandpa. The coachman said he had just fed him, and as soon as he would hitch Bill and Dick, he would let him go to sleep. P. said, "But you haven't given him his bath; his shoes are on him. I guess that is why he don't lie down."

16. [3 yrs. 9 mos.] She brought a picture of a baby in a cradle to me. On the side of the cradle was a small card. *She.* "That baby wants that card." *I.* "Can't she get it?" *She.* "No." *I.* "Why?" *She.* "Because she can't talk." *I.* "Why can't she talk?" *She.* "She hasn't got any mouth." *I.* "Yes she has; don't you see it?" *She.* "Well, she hasn't got any teeth." *I.* "Can't she talk with-

out teeth?" *She.* "No! my baby couldn't, but she's got three teeth now, and she can say 'Sadie.'"

17. [4 yrs.] S. and I were sitting out of doors one evening, and S. happened to see the moon come out from behind a cloud. "See, see!" she cried, "the moon has waked up." The next evening was cloudy, and, as we were standing by the window, I said, "Where is the moon tonight, S.?" "Oh," she replied, "it is asleep and hasn't waked up yet." Then, after a pause, "I guess it's tired tonight."

18. [4 yrs. 4 mos.] A few days ago H. came to me and said, "Did you know they'd taken Deacon W. to Grafton?" *I.* "Yes!" *H.* "Well, I spose it's the best thing. His folks [meaning his children] are buried there, and they wouldn't know he was dead if he was buried here."

19. [5 yrs. 3 mos.] *I.* "Why do we have Thanksgivings?" *F.* "So we can have a turkey." *I.* "What do we have Christmas for?" *F.* "So we can have some presents." *I.* "But some little boys don't have any presents." *F.* "Then they don't have any Christmas Day [pause]; perhaps they have Christmas Day when we don't."

20. [5 or 6 yrs.] Whenever we had a thunder storm I felt very much puzzled, and wondered what caused it. One day I went with my father into a mill, where I saw some machinery which made so much noise I could not hear anything that was said. After I went home, I began to think about what I had seen, and finally came to the conclusion that up in the sky there must be a lot of machinery which God would put in motion when He wanted it to thunder. I thought probably He had some way of making the machinery sound very loud, and gradually let it become softer until we could not hear it, and then make it loud again. I felt very glad indeed to think that I had found out what made thunder. I did not tell anybody of what I had been thinking.

21. [5 yrs. 11 mos.] *Child.* "I know what makes the sky; it's the smoke." He had been riding in the cars and noticed the smoke rising from engines.

22. [5 or 6 yrs.] L. being asked one cloudy day what made the sky so gray, answered "ashes."

23. [6 yrs.] K.'s brother had been traveling on a railroad on which had occurred an accident. Somebody remarked his luck in not being on the cars at the time of the accident. K. was by and said, "Well, M. never goes on the cars with the slippery wheels."

24. [5 or 6 yrs.] Jennie said, "What makes people sleepy?" Hilda replied, "Those little hairs on your lids. Every time they come against your eye, they make you sleepy."

25. [4 or 6 yrs.] W. asked A. how the stars and moon came into the sky every night. A. answered, "O, those are holes in the sky, and the light from heaven shines through." The next morning it was raining. W. came up to A. and said, "O dear me! A., they must have had a flood in heaven last night, 'cause, see the water coming through the holes where the stars were."

26. [7 yrs.] *Mother*, at the dinner-table: "You like apple pie, don't you, A.?" *Child:* "Yes, I do. I guess it's because I like the bottom crust and the upper crust and the apples."

27. [7 yrs. 8 mos.] The Sunday school teacher told the class that Jesus was crucified at the ninth hour. E. said, "I know why school begins at nine o'clock. It is because Jesus was killed at nine o'clock."

28. [7 or 8 yrs.] Last night as I was going home from school, a man passed me with a load of wood drawn by a small donkey. There were three or four little boys playing across the road. One of them said, "That's a dunkee." "No, it's a horse,"

said another. "No, sir!" answered the first, "it's a dunkee, because its ears go this way," at the same time taking hold of his own ears and wriggling them back and forth.

29. [7 or 10 yrs.] *J.* "I'm seven years old today." *T.* "Well, you're small for seven years." *J.* "Well, I won't be, long, because I'm growing all the time." *T.* "How do you know you are? I never saw you grow." *J.* "No, you don't see it, but you grow every minute." *T.* "How do you grow? What part commences first?" *J.* "O, your head begins first and grows up, and then the rest of your body, and then your feet commence. They grow right out of your shoes."

30. [8 yrs.] Yesterday two of Mrs. McS.'s scholars were disputing as to what made it rain. One said, "When the wind blows the dirt and sand out of the way, it rains."

31. [8 or 9 yrs.] P.'s class had a "picture-lesson" on the picture entitled "Saved," which represents a little boy who has evidently been saved from drowning by a large Newfoundland dog that is standing by him. P. wrote that the little boy had been on board a steamer that was wrecked, and that his dog had brought him ashore. Then he added, "The dog is very tired now, but when he gets rested, he is going in after the steamer."

32. [9 yrs.] The other evening something like this was said: "He is killing two birds with one stone." Johnnie looked up quickly, saying, "No one could kill two birds with one stone. I guess I could, though. I would fire the stone at one bird and kill him, go pick up the stone again and fire it at another bird and kill that."

33. [11 yrs.] M.'s mother was sitting by her, helping her with her music lesson. There was a mark over one of the notes like this, ⌒. Her mother asked her if she knew what a mark like that meant. *M.* "I don't know what it is, unless it's an eye and means to look out sharp and play it right."

34. [11 yrs.] In my Sunday school class, we were talking about Christmas. One girl said, "Three wise men from the East brought the Lord gold, frankincense and myrrh." One of the children said, "What is myrrh and frankincense?" M. said, "Oh, I know what frankincense is; it's the money they use in France; but when they talk in French, they say it backwards." Then quite unconsciously she said to herself, "Cents in France."

IV.—FALSE REASONING.

35. [3 yrs. 4 mos.] I was at the sewing-machine at work, and noticed that something was blocking the wheel. I stooped down, exclaiming, "What is the matter?" and saw that it was too near the side of the house. I moved it away and it was all right. While stooping down, I saw a little card on the floor and picked it up. When I sat down again, W. said, "The card was on the floor; that was what the matter was."

36. [3 yrs. 6 mos.] *I.* "I wonder what makes R.'s hair curl so tight." *R.* "Why, it's 'cause I eat so fast."

37. [3 yrs. 6 mos.] Whenever I looked sober, A., who was with me two weeks this summer, would look up to me and say, "Are you mad, little Abbie?"

38. [3 yrs. 6 mos.] Sunday morning, a small alligator, which H. has for a pet, had been eating fish and was all stuffed out. *H.* "What makes the alligator so fat, papa?" *Mr. H.* "He's been eating fish." *H.* "What's he want to eat fish for? I don't see; 'tain't fish day." Afterward in church she looked up to the choir box and saw her

uncle, who is very a stout man, and she said, "Papa, does fish make *folks* fat same as alligators?" *Mr. H.* "Sometimes." *H.* "Is that what's the matter with Uncle S.?"

39. [3 yrs. 6 mos.] G. had new stockings on. At night, when his mother took them off, his feet were colored. G. said, "O, mamma! these ain't my feet; these ain't the feet I had this morning."

40. [4 yrs.] M. was sitting on a chair near the window, looking at the rain. Suddenly he turned round and said, "I would like to go out in the rain and get bigger, 'cause the rain makes you grow."

41. [4 or 5 yrs.] The other morning I was visiting J. L. He was troubled because he had no little sister to play with him. When he asked his mother to "get him a little sister," she told him that when children got cheap, she would buy him a little sister. In the afternoon, he came home with a ticket for an entertainment that was to be given the next week. On it he read, "Children half-price,—15 cents." He jumped up and down, clapping his hands with joy, exclaiming, "Oh, Annie, now mamma can buy a 'itty sister for me, for 'itty children ain't only half-price now,—only 15 cents."

42. [5 yrs.] *Annie.* "What shall you be when you are a man?" *R.* "I don't know yet." *A.* "Would you like to be a farmer?" *R.* "No." *A.* "A doctor?" *R.* "No. I'll be a minister, and then I'll have all the money that folks put in the box at church."

43. [5 yrs.] Mabel and her mother were walking in a pasture. They came to a very crooked tree and Mabel said, "Oh, see that tree sitting down!"

44. [5 yrs.] W.'s mother had taught him to take off his hat when he entered a house or church. When he entered church one Sunday, he removed his hat; and the next day, he removed his hat when he entered the store. His cousin asked him why he removed his hat. He said, "You told me yesterday to take off my hat; why shouldn't I today? It's the same building." The store and the hall where the meetings were held were in the same building.

45. [5 yrs.] W. came in crying because he had some lime in his eye. His mother tried to quiet him, but could not for quite a while, because he was afraid it would "smoke." He had been watching masons making mortar.

46. [5 yrs. 3 mos.] *E.* "I have a lovely cat. It is part black." *I.* "What is the other part?" *E.* "White." *I.* "And what is the other part?" *E.* "Nothing. Didn't you know a cat had only two parts, one on each of its sides?"

47. [5 yrs. 8 mos.] A. always has somebody spread her bread. The other day she called for some butter on a small butter-plate. This was given her. Then she said, "Now I am a woman."

48. [5 and 10 yrs.] D. and K. live in a town of about three thousand inhabitants. D. is 10 yrs. old and K. about five. *D.* (reading about an earthquake): "Oh, isn't it dreadful, mamma? Do you suppose we will ever have one here?" *K.* "Why, no, D., they don't have earthquakes in little towns like this."

49. [5 yrs. 8 mos.] We were talking about the color of eyes. D. asked me what color my eyes were. I told her they were gray. Then she said, "You are getting to be an old woman."

50. [5 yrs. 11 mos.] C. has been to school since November, and was punished the other day. He came home and said to his mother, "Mamma, teacher rat-handed me." *Mother.* "I'm afraid you've been a naughty boy, C." *C.* "It ain't 'cause I misbehaved bad, mamma, it's 'cause I want to turn round all the time and teacher don't want me to." *I.* "How many times did she hit you?" *C.* "Two times on one hand, three on one hand." *I.* "Didn't you

cry?" *C.* "No, it didn't hurt much. I tell you what, spit on your hands and it won't hurt. That's what I did."

51. [5 or 6 yrs.] J. M. was told that people made soup out of stones. Not far from our house, there was a sand bank. J. M. went over there and picked a large number of handsome stones. He took only those that were round and smooth. He thought that the handsomer the stones were, the better soup they would make.

52. [6 yrs. 1 mo.] *George.* "My throat aches and I can't swallow." *Mother.* "You must have taken a cold." *George.* "No. Philip scratched me coming from school, and I think that is why my throat is sore now."

53. [7 yrs.] *C.* "Do hop-toads have rheumatism?" *I.* "No." *C.* "Then why do they hop?"

54. [7 yrs. 3 mos.] *E.* (seeing a cloud pass between the sun and the earth): "Why don't the sun burn up the cloud?" *Father.* "The cloud isn't near enough to it." *E.* "If I should go clear up in the sky, would I be hotter?" *Father.* "The higher you get, the warmer you are." *E.* (suddenly jumping off the stone he was sitting on): "There, I am warmer now than I was before, for I am nearer the sun."

55. [7 yrs. 8 mos.] Hilda was watching the black smoke as it rose from the stack of the mill. She said, "It's going to rain tomorrow." *I.* "How can you tell?" *Hilda.* "You see that black smoke makes black clouds, and that's the ones that rains."

56. [8 yrs.] In giving a lesson on the woodpecker, I told the children that on the end of its tongue was something sticky, a kind of gum. Tim looked very sober for a second, and then said, "Do you suppose it is spruce gum?"

57. [8 yrs.] W. saw outside of a butcher's shop some squash advertised for two and a half cents a pound. When he got home, he told his mother that there were lots of watermelons selling for two and a half cents a pound. *Mother.* "Are you sure they are watermelons?" *W.* "Yes, 'cause I tried to lift one and it was awful heavy."

58. [9 yrs.] Maud and her mother were going to Worcester to spend the day. M. had never eaten in a restaurant. *Mrs. B.* "What are you going to have for your dinner?" *M.* "I will see what they have on the table." *Mrs. B.* "But you can have anything you want; they will cook anything for you." *M.* [after a little hesitation]: "I guess I will have some beans, only it will take them so long to cook." *Mrs. B.* "Oh, you can have those at home any day; think of something nice that you can't have at any time." *M.* "I guess I will have some turkey, if you will tell them this morning, so they can cook it."

59. [9 yrs.] "In my Sunday school class, talking of Christmas, one girl spoke of Bethlehem. "Where is Bethlehem?" I asked. S. said, "It's near the equator, 'cause in the picture of the Virgin Mary she has a lace dress, and hot places are near the equator."

60. [9 yrs.] Last Sunday in my Sunday school class I asked this question: "Did the lions touch Daniel when he was put into their den?" Eddie raised his hand and said, "No, they didn't touch him." *I.* "That is right; they did not touch him; but why?" *E.* "'Cause he belonged to Barnum's circus, I suppose."

61. [9 yrs. 1 m.] The wind was making a great racket. J. looked out and saw the snow blowing down in the direction of Millbury. She said, "I'd hate to live down in Millbury." *I.* "Why?" *J.* "There must be a lot of wind down there, it's all blowing that way."

62. [9 yrs. 6 mos.] L. has had inflammatory rheumatism, and at one time couldn't move her limbs, or have any one touch them.

One night while she was in this condition, she fancied she must have a pillow put under one leg. Her mother told her it would hurt terribly. L. said, "No, it won't; I'm going to laugh just as hard as I can, and you put it under quick, before I stop. It can't hurt if I'm laughing."

63. [10 yrs.] E. had got ready for church before the others and was waiting. There was some money on the table, among which was a two-cent piece. E. looked at the different pieces and read what was printed on them. When he took up the two-cent piece he said, "Oh, mamma, here is some money made on purpose for the contribution box, for it says, 'In God we trust.'"

64. [10 yrs. 9 mos.] *M.* "Say, May, isn't it colder riding than walking?" *May.* "Yes, I think so." *M.* "Do you know why?" *May.* "No; do you?" *M.* "I think it is because you are higher up in the air."

65. [11 yrs. 5 mos.] *E.* "Oh, sir, they've plastered that tree" (meaning a white birch). *I.* "What makes you think so?" *E.* "Because when I rubbed my hand on it, the white comes off on it. See! there's a limb that's black, where they forgot to plaster."

66. [12 yrs. 3 mos.] F. is a great lover of cats. One of his kittens died; and when he went to bury it, he only put enough dirt over it to cover it. When asked why he did not dig a deep hole and put him in it, he said that cats had seven lives and that if his cat came to life, he didn't want it to smother.

67. [13 yrs.] Mrs. P. and I were talking about a teacher's needing two eyes in the back of her head. *W.* "There's lots done when a teacher is writing on the blackboard that she can't see; but when you have a teacher who wears glasses, you want to look out for her. She can see in her glasses what you are doing."

68. [14 yrs.] The boy in the family where I board came into the house this noon, and when he sat down to dinner said, "When I hang by my toes on the horizontal bar, the blood rushes to my head. Now when I stand on my feet, why doesn't it all rush to my feet and stay there?"

V.—THOUGHTS AND REASONINGS ABOUT GOD, CHRIST, HEAVEN.

69. [2 yrs. 9 mos.] H.'s aunt, who lives with H.'s parents, has always told him that God is in heaven. H.'s mother tells him that God is everywhere, but he always says, "No, God is in heaven." One day he was looking at some photographs with his mother, when they came to one of his great-grandmother. *H.* "Who is that, mamma?" *M.* "That is grandma." *H.* "Which grandma? the big one up stairs in the frame?" *M.* "Yes." *H.* "Where is she now?" *M.* "She is dead." *H.* "Does she feel better?" *M.* "I think she does." *H.* (after a pause): "Where is she gone?" *M.* "She has gone to heaven, I think." *H.* (after a pause): "Is God dead, too, mamma?"

70. [3 yrs.] Mrs. H. and G. were looking at two especially bright stars. *Mrs. H.* "Those are God's eyes." *G.* "God's two, big blue eyes?" *Mrs. H.* "Yes dear, and He says He is seeing you all the time." After a pause of full three minutes, G. turned a puzzled face to her mother and said, "Mamma, where's God's legs?" Not receiving any answer, because her mother was afraid of laughing if she spoke, G. added, "G. break 'em off."

71. [3 yrs.] L. saw a cupola on a barn, the first she had ever seen. Looking up at it intently, she said, "Does God live in that little house?"

72. [3 yrs.] W. said to his father, "If I'd gone up stairs, could God make it that I hadn't?" The same boy asked one day for some sweet potatoes. He was told it was not the time of year for them. He said, "Can't God make them now?"

73. [3 or 4 yrs.] R. had not been well and his mother was asking his papa whether he thought grapes were good for him. R. said, "Papa, I don't think God made my bowels right."

74. [3 yrs. 9 mos.] H. was told a little about Easter and the resurrection of Christ on that day. The Sunday after Easter he went to his mother and asked if it was Easter. She told him that the Sunday before was Easter. *H.* "Well, did Christ rise up last Sunday?" *M.* "No, it was the anniversary of the resurrection of Christ." *H.* "Well, if Christ died all up and then got up again, why can't grandpa get up?" *M.* "I can't explain it to you, H.; you will have to wait until you grow older." *H.* "I'm just going to watch every Sunday and see if grandpa don't get up and come back to us."

75. [4 yrs.] S. had been to Sunday school, and the lesson was about Jesus' turning water into wine. When he went home he said, "Mamma, I think Jesus must have been a bad man." *Mrs. B.* "Why, what makes you think that?" *S.* "'Cause he made wine, and that makes folks drunk."

76. [4 yrs.] H. refused to say his prayers the other night, and when asked the reason said, "Why, they're old. God has heard them so many times that they are old to Him, too. Why, He knows them as well as I do myself."

77. [4 yrs. 11 mos.] R. was being taught his Sunday school lesson, orally, from the text, "God seeth us alway," when he asked if he could see God. He was told that he could not. "Well," said he, "they said I could see the stars, but when I went to bed the other night they all went away, so I couldn't see them; and now God is all *fushed out*."

78. [4 and 5 yrs.] Sunday E. was taken to church, and saw for the first time some one baptized. When she was coming home Miss P. asked her what she saw. E. said, "We saw a man put another man in the water." Miss P. asked, "What else?" E. said, "We saw the man come up again all wet; then the other man wiped his face and man go and get his clothes dry and come back." She stopped talking for a few minutes and then said, "When my mamma washes me she takes off all my clothes."

79. [4 yrs. 11 mos.] N.'s father did not want him to go to walk, and said, "Don't go away, N.; who will take care of me if you go off?" "Well, papa, you say 'Now I lay me,' and God will take care of you."

80. [5 yrs.] When R. lived in the country, he used to ride on the load of hay a great deal. Sometimes the men would not get in all the hay till after dark. One night his mother went out with him, and, leaving him with the men, went into the house and lit the lamps. R. saw them shining through the windows. The next night she went out with him and stayed out. When they were riding in, R. looked at the house and saw that it was all dark. Then he looked up at the sky and saw the stars shining, and said, "Why, mamma, I guess God's gone in the house and lit all his lamps."

81. [5 yrs.] *Charlie.* "Do they sell feathers in stores, mamma?" *Mrs. B.* "Yes, but what made you think of it?" *Charlie.* "Why, you know little E. died last week and went to heaven. I wondered where he got the feathers to make his wings of."

82. [5 yrs.] H. had been kept in the house for some time because it was raining. He had been looking out of the window, when he said, "I guess God's wasting water."

83. [5 yrs. 1 m.] E. had been told she could not go to Sunday school on account of the rain. After a few minutes she went to the window and put her face against the pane and said, "I guess God won't care if I stay at home. Of course He knows it's raining."

84. [5 yrs. 2 mos.] I used to wonder if babies went to heaven when they died; and finally asked my mother if God knew whether they would have been good or not, if they had lived.

85. [5 yrs. 8 mos.] As I was going home last night, two little boys came out of a house into the yard. The lawn had just been sown and the grass was just visible. *First Boy.* "See how the grass grows." *Second Boy.* "What makes it grow?" *First Boy.* "God does." *Second Boy.* "He don't. It's the manure they put on the ground."

86. [5 or 6 yrs.] When I was five or six years old I decided that I ought not to be afraid in a thunder-shower. I was exceedingly timid and had to go over to myself the reasons for not being afraid so many times that they were strongly impressed upon my mind. I reasoned that God could take care of me just as well in a thunder-shower as any other time, and that being afraid might make him vexed at me, so he would let me be struck. I think I had heard some one say that God liked to have his children trust in Him, and I supposed that meant all little children. This reasoning had an effect on me, so that now I am not afraid, but enjoy a shower. I had many strange fancies about God, his house and what he liked to have little girls do,—which are not distinct now. I used to climb into an old apple tree to visit Him at times, and tell Him what I wanted.

87. [5 yrs. or more.] An electric light was being put in front of the house. W. said, "Mamma, when they get the electric light done, God won't have to make the moon any more, will He?"

88. [5 yrs. 11 mos.] W.'s brother fell down on the ice and hurt him badly. W. went into the house and said, "Talk about God's being good! I should think He was good—make all this ice, and make T. fall down and most kill himself. I should think He was good."

89. [6 yrs.] A. had found a dead hen. He got a few old papers, some twigs and a few sticks of kindling wood, and piled them up in a regular way; then cut off a few of the pieces of twigs that stuck out. He put the old hen on top of the pile and set fire to it. His mother came out just as the flames had commenced burning the hen, and she asked him what he was doing. He said, "I am offering a sacrifice for the sins of all the neighbors."

90. [6 yrs.] I was visiting my cousin in the city. Sunday, after we came home from church, he wanted me to play games with him. I said I would; but Aunt F. heard us and said it was not right. "Oh," said I, "we can play, then ask God to forgive us afterwards."

91. [6 yrs.] Mrs. J. was reading to G. about Jesus' walking on the water. He said, "Mamma, do you believe He could walk up our ice-house barefooted?"

92. [6 yrs.] There was a shower-bath in the house, and M. thought that rain was caused by God, who pulled a string just as she did for a shower-bath.

93. [6 yrs.] *Child.* "Mamma, what's a Christian?" *M.* "One who loves God." *Child.* "Then I'm a Christian." *M.* "What makes you think so?" *Child.* "Because I love God. But I hate you and papa." *M.* "Then you are not a Christian." *Child.* "Yes I am too, for I love God."

94. [6 yrs.] A river went along back of the house where F. lived. *F.* "Did God make the river?" *Observer.* "Yes." *F.* "He must have had a big shovel."

95. [7 yrs.] To-day W. talked almost incessantly about what the rain was, where it came from, etc. His brother, J., began to inform him. I heard J. say to W., "When the clouds are rent or opened, the rain drops out. *Rent* means *torn*, just as you would tear your clothes." W. thought for a minute and then said, "I should think God's mother would get tired mending."

96. [7 yrs.] S.'s little twin sister had just died two days before. When he was told he had lost his little sister, he replied, "Well, I suppose she has got to heaven by this time."

97. [7 yrs.] W. was with me one Sunday afternoon. I was reading, so he hadn't said anything to me for some time. At last he said suddenly, "The heaven is my chair and the earth is my footstool. They must have long legs to reach round the world." We found out afterward that the passage he had tried to repeat had been part of his Sunday school lesson.

98. [7 yrs.] When I was about seven years old, the following questions began to trouble me. I had been taught that God created all men, that he knew everything that had occurred in the past or would take place in the future, and that He desired all men to be saved. I knew that a great many are lost. The question that troubled me was this: "Since God knows everything and wishes every one to go to heaven, why does He create those who will be lost?" I think I puzzled over this for four or five years, and the only conclusion I remember coming to was that probably God willed not to let Himself know. This was not entirely satisfactory.

99. [7 yrs.] H. had the toothache. *H.* "My tooth aches like the devil." *Mrs. W.* "Why, Henry!" *H.* "God is to blame for my toothache." *Mrs. W.* "No, He isn't. You eat candy and that makes your tooth decay and ache." *H.* "Well, anyway, God gives us the things to make candy of."

100. [7 yrs. and 9 yrs.] Inez and H. and I were walking along the road near our house, and met our dog Jack coming home from a neighbor's house. Inez remarked that father did not like to have Jack go off so, and H. said, "I know he don't like to have him, and Jack knows he don't, too, and he is a naughty dog, not to mind. I guess he forgot to say his prayers this morning." Then Inez said, "I wonder if dogs can pray anyway. Do you suppose they can? And I wonder where they go to when they die." *H.* "I guess Jack won't go to heaven when he dies, if he runs away much more. Don't you guess so too, Inez?"

101. [7 or 8 yrs.] W. went to make his grandmother a visit, and the first morning after he got there, his grandmother asked him if he said his prayers the night before, and he said, "No! I forgot it." *She.* "You mustn't neglect to say your prayers, W. God won't take care of you if you do." *W.* "Well, He did."

102. [8 or 9 yrs.] There was a picture, in a book, of Christ walking on the sea. E. saw it. *E.* "Didn't he sink?" (said with great earnestness). *I.* "No." *E.* "Well, he was pretty light, wasn't he?"

103. [10 yrs.] One night J.'s aunt asked her if she had said her prayers, and J. said she had not. Her aunt said, "Why, J., how will God know that you love Him if you don't tell Him of it?" J. replied, "I have said them every night; I should think he would know it by this time."

RECORDS ARRANGED ACCORDING TO AGE OF CHILDREN OBSERVED.

104. [1 yr. 2 mos.] J. was walking around the room and came to a chair which had a wreath of flowers embroidered on the seat. He stood and looked at it for a few minutes and then bent down and smelled of a spray of forget-me-nots and tried to pick them up. He went away, but came back again and did the same thing. Every time he comes into the room he will go directly to that chair and smell of the forget-me-nots.

105. [1 yr. 4 mos.] C. likes to climb into a chair beside the dining-room table and play with the colored vinegar bottle and other dishes, but has been taught that he must not. He was playing about the room with a tin can and a wooden stopple, when he walked up to the table, pushed them up on it until he could not reach them, then drew a chair up to the table and climbed into it as though he had a right to his playthings. This same thing has been repeated.

106. [1 yr. 7 mos.] When I went upstairs yesterday I said, "Does baby want to go?" A. immediately started for a shawl and brought it to me; then he pulled the coal-hod from its place and wanted me to take that. Several times I have taken him with me when I have been down stairs for it, and I think he thought that was where I was going.

107. [1 yr. 8 mos.] S. was trying to put on her rubbers. Her mother told her to push. When she was putting on her dress soon after, S. said, "Push!"

108. [1 yr. 8 mos.] S. had a doll whose hair had all come off, and after visiting her grandfather, who was bald, she named her doll "Grandpa."

109. [1 yr. 10 mos.] W. has a rubber ball that he throws on the floor and watches while it rebounds. He takes his kitten and throws it on the floor in the same way, and looks quite disappointed that it does not rebound like the ball.

110. [1 yr. 10 mos.] C. was watching some horses drawing a load up the hill in front of the house one cold, frosty morning. As he noticed the breath coming from their mouth and nostrils he turned to his father, who uses a cigar occasionally, and said, "Horses 'moke, papa, horses 'moke."

111. [2 yrs.] T. pulled the hairs on his father's wrist. *Father.* "Don't, T., you hurt papa!" *T.* "It didn't hurt grandpa."

112. [2 yrs. 5 mos.] M. said, "Gracie can't walk, she wears little bits of shoes; if she had mine she could walk. When I get some new ones, I'm going to give her these, so she can walk."

113. [2 yrs. 5 mos.] Mrs. K. was putting on M.'s new stockings, when M., who was very much interested, said: "O, mamma, won't these make me grow?"

114. [2 yrs. 6 mos.] A. was writing. M. came to her and said, "Write, write." A. gave her pencil and paper and let her sit on a chair beside her. "After a while M.'s aunt wanted M.'s chair, so she took her up in her lap. M. sat quietly a few moments, then got down. She went out to the stove and coming back said, "Auntie, wood, wood!" Her aunt got up to put in some wood, when M. at once got into the chair and began to laugh. The stove was full of wood.

115. [2 yrs. 6 mos.] C. was picking out some things from a heap of rubbish, and found an old ink-bottle with a little water in it. He carried it to his mother and said, "C. mustn't have this."

116. [2 yrs. 6 mos.] Mrs. L. and her two children were in the yard, and B. and N. were pulling up the weeds. Their mother told them not to pull any more, as they were getting their dresses dirty. B. was not seen for some time. The next I heard was this: "B., didn't I tell you not to pull any more weeds?" "I ain't pulling weeds, I'm cutting 'em." B. had gone into the house and got a knife and was cutting off the tops of the weeds.

117. [2 yrs. 6 mos.] A.'s father told him to show where he kept his kisses. A. pointed to his mouth. His father said that he wanted to see them. Then A. pointed into his mouth and at last said they were in his throat.

118. [2 yrs. 8 mos.] The first time F. noticed the moon, it was full. Soon after, she saw it during the first quarter and ran to her mother, saying, "Oh, mamma! G. [her little brother] has meddled with the moon."

119. [2 yrs. 9 mos.] I was reading a book one evening when W. asked me to do something for him. I did not answer him immediately, nor pay any attention to him. He waited one or two minutes for me to speak, and then he looked up into my face, then down on the book to see where I was reading, and covered up the place with his hand. He kept his hand there until I did what he asked me to do.

120. [2 yrs. 9 mos.] He usually has a nap in the forenoon, but Friday he did not seem sleepy, so his mother did not put him to bed. Before long he began to say, "Bolly's sleepy; mamma put him in the crib!" This he said very pleasantly at first; but, as she paid no attention to him, he said, "Bolly cry, then mamma will." And he sat down on the floor and roared.

121. [2 yrs. 9 mos.] M. has very large, bright eyes. I asked her what made them so bright. She said, "Cause the sun comes in." She knows it is the sun that makes a room bright.

122. [2 yrs. 10 mo.] L. had some new shoes last Friday and was very proud of them. Saturday morning I heard her saying to her old shoes, "Papa bringed me some new shoes, so now you must go down to Dennis's and stay, 'cause I can't wear you any longer." This summer I bought her some new shoes and left her old ones at the store, Dennis's. She seems to think that is the way to do.

123. [3 yrs.] C.'s mother told him to stay with his baby sister while she went down stairs. As she went up again, she met C. coming down. Being asked why he left the baby, he said there was a bumble-bee in the room and he was afraid he would get stung if he staid there. His mother asked him if he wasn't afraid his little sister would get stung. He said, "Yes," but that "if he staid in the room the bee might sting them both, and then she would have two to take care of."

124. [3 yrs.] It was between five and six in the afternoon; the mother was getting the baby asleep. J. had no one to play with. He kept saying, "I wish R. would come home; mamma, put baby to bed, so R. will come home." I usually get home about six, and as the baby is put to bed about half past five, he had associated the one with the other.

125. [3 yrs.] W. likes to play with oil paints. Two days ago my father told W. he must not touch the paints any more, for he was too small. This morning W. said, "When my papa is a very old man, and when I am a big man, and don't need any papa, then I can paint, can't I, mamma?"

126. [3 yrs.] M. awoke long before daylight and ran into grandma's room to call her. But grandma was asleep, so the child went away. In a few minutes she returned and said, "grandma, get up."

Grandma was awake now, but did not want to rise yet; so said, "Pretty soon, baby." "Well," said M., "if you don't get up pretty soon, it will be dark, and then you'll have to stay in bed all night."

127. [3 yrs.] When the whistle blew, at noon, W. said, "Papa will come in a few minutes for dinner."

128. [3 yrs.] B. climbed up into a large express wagon, and would not get out. I helped him out and it was not a minute before he was back in the wagon. I said "B., how are you going to get out of there now?" He replied, "I can stay here till it gets little, and then I can get out my own self."

129. [3 yrs.] G.'s aunt gave him ten cents. G. went out, but soon came back, saying, "Mamma, we will be rich now." "Why so, G.?" "Because I planted my ten cents, and we will have lots of ten cents growing."

130. [3 yrs.] When the hot water faucet is first turned on, the water spurts out in jets. S. was in the kitchen when her mother turned on the hot water, and she exclaimed, "O, mamma, the water is choked; see how it coughs!"

131. [3 yrs.] G.'s little brother died the other night while she was in bed. When she saw him in the morning, she asked her aunt what was G. now. Her aunt told her that he was a little angel now. "Well!" said G., "he is lying on his back, and he hasn't any wings on."

132. [3 yrs.] One morning after breakfast, B. wanted some sugar out of the sugar-bowl, so he said to his mother, "You go out into the kitchen." *Mother.* "What mischief are you into, that you want me to leave the room?" *B.* "I wanted a bit of sugar."

133. [3 yrs.] One day L. picked up a hair ornament which he found on the floor, and looked intently at it. He then went to his mother and said, "My! mamma, dis only one leg." He had seen his mother wear it, and thought it ought to have two prongs like the hair-pins.

134. [3 yrs.] F. is not allowed to go to the table to eat unless she has her face and hands washed and her hair combed. The other day she went to a lady visiting at her house and said, "Please wash my face and hands and comb my hair; I am very hungry."

135. [3 yrs.] H. was looking at some old papers. In one of them there was a picture of a man sitting in front of a fire-place, his elbows on his knees and his face in his hands. H. looked at this picture for some time without saying anything, and then took the paper to his mother and said, "Mamma, after he feels bad a little while, he'll feel better, won't he? Won't he feel better by and by?"

136. [3 yrs.] E. was playing around, and the dog that was in the room commenced scratching himself. Mrs. M. asked E. what made the dog scratch. E. said, "Skeeter bite."

137. [3 yrs.] If C. is told not to touch a certain thing, that it will bite him, he always asks if it has a mouth. The other day he was examining a plant, to see if it had a mouth. He was told not to break it, and he said, "Oh, it won't bite, because I can't find any mouth."

138. [3 yrs.] E. was told that on the church next my house was a large clock. She heard a bell on a locomotive at Lincoln square ring. She opened her eyes wide and said, "I know; there's a great big clock out here on the church."

139. [3 yrs.] A little companion of W.'s had just put on a new suit of clothes, when W., who had been looking at him for sometime, said, "H., I wish you'd die." *H.* "What do you want me to die for?" *W.* "Why, if you died, I could have your new clothes."

140. [3 yrs.] After saying his prayer, F. said, "God bless papa and don't let him die! God bless mother and don't let her die! God

bless all my friends, and don't let them die! Mamma, if I pray 'Don't let them die,' will they ever die?" *She.* "Of course, everybody has to die sometime." *F.* "Then if everybody dies before us, who will bury us?"

141. [3 yrs.] The other night, about twenty minutes of six, J. wanted a cookie. His grandma thought it was near supper time and said, "J., wait twenty minutes and you will have supper." J. (after a while): "Grandma, do you remember when you was a little boy asking for a cookie?"

142. [3 yrs.] On the evening of the 17th of March, J. went down street to see the parade. He noticed the drums, and when he got home, he wanted a drum. I gave him a pan. He was delighted with this at first, but after a time, he said, "K., they didn't have to carry their drums in their hands, and I have to. They had them tied to them some way, so they could use both hands."

143. [3 yrs.] I was telling J.'s mother about an accident which had happened to our horse. The horse had jumped over a fence and run an iron bar into his breast. J. stood listening, and when I had finished, she said, "Did it hurt him, mamma?" Her mother told her that it did hurt him, and then J. ran off to play. She had been gone about twenty minutes when she came back and said to me, "What made the horse jump over the fence?" She is always doing this same way. If she hears anything, she will go off somewhere and think it [over]; or she seems to, by the questions she asks afterwards.

144. [3 yrs.] H.'s father on Sunday mornings rises much later than on week-day mornings. Wednesday morning, he over-slept. When he came to breakfast, H. said: "Papa, is this Sunday morning?"

145. [3 yrs.] E. was at the dinner-table, and became angry with her mother and said to her, "You are a monkey." *Mother.* "What did you say?" *Eva.* "I said that I was a monkey."

146. [3 yrs.] J. had been told that if he told a lie the blacksmith would burn his tongue out. One day when he was at his aunt's house, he saw that her arm was burned. He said nothing at the time, but that night, when his uncle came home, he ran to meet him and said, "Oh, uncle, the blacksmith has been down to auntie. But I guess it wasn't a very bad lie, for it was her arm he burned."

147. [3 yrs.] A. said to her mother, "When I am a big girl and you are a little girl, I shall whip you just as you whipped me now."

148. [3 yrs.] My aunt was very sick and sat bolstered up in bed. I said to my sister, "I don't believe auntie is sick any more than I am." Then to my aunt I said, "Auntie, I guess if you are very sick, you would lie down." I do not remember any more of what was said, but I know I thought it very queer that a newspaper was on the bed. I suppose she had been reading it. Those whom I had seen when sick were not able to be moved, and I thought it impossible to be sick and not lie in bed.

149. [3 yrs.] Maud P. brought her brother S. to visit her school the other day. One of the boys, with a deep, pathetic voice, began the reading lesson. When he had finished, S. said in a solemn tone, "Amen."

150. [3 yrs. 1 mo.] There have been some carpenters at work at our house. There is one man who takes a great deal of notice of L., but she does not seem to like him. I said, "L., can you give Mr. —— a match?" *She.* "No, him is naughty, him puts nails in the floor." She had been told not to drive tacks into the floor.

151. [3 yrs. 1 mo.] E. was playing with her doll and she put it in the sun. I was afraid it would melt, as it was wax, so I said, "E.,

I don't believe your doll likes to have the sun shine in her eyes." "Yes, she does," replied E. *I.* "How do you know she does?" *E.* "Why, I like the sun, and my dolly likes everything that I do."

152. [3 yrs. 2 mos.] J. very often comes to my house. When she asks to go home, I coax her to stay longer. When she found that I would not take her home when she wanted to go, she would say, "I must go home, my mamma (or papa) be kying." One day when I was visiting at her house, I promised her that I would take her home with me when I was going. She was much pleased, and sat near me for a long time. When she thought I should go, as she was going with me, she said, "Your mamma be kying for you."

153. [3 yrs. 2 mos.] W. was provoked with his father and said, "Go along, old papa." When his grandmother has corrected him, he has often called her "old grandmother." But the minute he said this to his papa, he knew it would not do, so he said, "No, *little* papa."

154. [3 yrs. 2 mos.] I was giving M. some cough syrup and E. ran to me saying, "I am sick, too, and I want some medicine." She then tried to cough. Every time she would see me taking the syrup bottle afterward, she would begin to cough. The syrup was very sweet.

155. [3 yrs. 5 mos.] I had promised C., when I left home for school in the morning, that I would bring some one home with me to see him. When I came home at night, I came alone; the person I expected to come with me found it impossible to do so. The first thing C. said was: "Where is she?" I said, "She could not come, C." He said to his mother, "If I had done that, you would have said, 'C., God heard you tell that lie and He is sorry;' but seeing it is L., I suppose you think it is all right. When I get as big as she is, then I can say what I want to, can't I?"

156. [3 yrs. 6 mos.] R. and her mother went to her grandfather's funeral. Her mother had a new hat and R., seeing her crying, whispered, "Mamma, don't cry and feel so bad; your hat looks splendid."

157. [3 yrs. 6 mos.] A party of us went to spend the day at my uncle's. When we got ready to come home, my uncle had not got home with the horse so as to carry us to the station, and we began to be afraid we should miss the train. We had walked to the house in the morning, but did not want to walk back to the station at night. Some one of the party said, "Well, if he don't come pretty soon, we shall have to walk over to the station." W. looked up at us and said, in a drawling tone, "You walked down, didn't you? Well, then, you can walk back, can't you?"

158. [3 yrs. 6 mos.] This little girl, looking up in my face, said, "Seems to me J. looks sort of cross." *I.* "She does?" *H.* "Yes, up above your nose." In two or three minutes, she wet her forefinger in her mouth and commenced rubbing it up and down on my forehead. *I.* "What is the matter, H.?" *H.* "It looks kind o' cross."

159. [3 yrs. 6 mos.] W. had been playing in the yard all the morning, but about half-past eleven, he commenced to cry. He said that he felt cross and must have his dinner. He felt so much better after dinner that he came up stairs and told us that we would feel better if we would eat our dinner.

160. [3 yrs. 7 mos.] W. and L. were playing together with some boards in bed. L. dropped one of the boards and it fell under the bed. W. told her to go under the bed and get it. I told her not to go, because she would bump her head; but W. kept telling her to go, and at last he said, "Baby, you go; you got a small head."

161. [3 yrs. 8 mos.] L.'s aunt was visiting her, and while there, one afternoon, was mending stockings. L. had been watching her a long time, but was perfectly quiet, when suddenly she said, in a very decided way, "Oo ain't darnin' them stockins right at all; my mamma puts 'em on a darner, and I guess you better ask her to show you how."

162. [3 yrs. 9 mos.] A young man living in the next house to S. is quite lame and uses a crutch. One night last summer he was watching some children play croquet. He walked around the croquet-ground two or three times and S. supposed he was playing. After watching him a while, she came home and said to her aunt, "Aunt Emma, if I had a croquet mallet tied to my foot, could I play croquet like that man did?"

163. [3 yrs. 9 mos.] Mrs. L. told her little boy about the child that got killed by lumber falling on it. *Mrs. L.* "You must not go near those new houses, W.; you may get hurt like the little child I told you of." *W.* "Why didn't he jump when he saw it coming down? I would jump if I saw it coming down, and then I wouldn't get killed."

164. [3 yrs. 9 mos.] T. went into an empty room and was gone quite a while. His mother went up stairs and found him with three little kittens that were about a day old. He had them by the tails. His mother said, "Why T., put them down; they are rats." *T.* "No, they ain't." *She.* "Why, yes they are." *T.* "No, they ain't. Rats don't say 'Mew, mew,' mamma."

165. [3 yrs. 10 mos.] C. had been running about the room jumping on the chairs, and now and then striking the keys of the piano. His mother told him to sit down, and took him on her lap. He kept teasing to get down. Suddenly he threw the bag of candy that he had across the room and then said he wished to get down. His mother took no notice. C. then asked if he could get his bag of candy. His mother said, "Yes." After getting his candy he sat on the floor, away from his mother.

166. [3 yrs. 11 mos.] J.'s mother was cutting out some round pieces of cloth. Suddenly she said, "I do wish these scissors were sharper, it would be so much easier to round these." J. dropped the thing he was playing with and ran and fetched her a poker. His mother asked him what he wanted her to do with it, and he said, "Why, can't you turn round the corners better? D. can make his horse cars go round nice when he uses his poker; but it's bigger than that."

167. [About 3 yrs.] H. wanted her father to buy her some shoes, and was told that he couldn't, for he hadn't any money. That night he happened to bring some new shoes home for himself and had forgotten what H. had asked for in the morning, until she said, "You can buy some for yourself."

168. [3 and 4 yrs.] I was at E.'s house to stay for a few days alone. About dusk the first night I was homesick and cried. E., seeing me cry, came to me and said, "What's the matter? Spider bite you?"

169. [3 and 4 yrs.] Two little boys were playing, when the younger saw the hose carriage going slowly down a side street, and called out, "Oh, there's a fire," and both ran toward home, screaming, "O mamma, come quick, there's a fire!"

170. [4 yrs.] *I.* "Why don't you go to school?" *C.* "Mamma won't let me, because I haven't any teeth." *I.* "Why, what did you do with them?" *C.* "I don't know; I guess baby has one of them, because last night mamma said baby had a new tooth and she didn't have any before. I guess it's mine." He had broken one that day.

171. [4 yrs.] W. had some candy and I asked him if he wasn't going to give me a piece. He said, "No, I am going to give it to my little sister." *I.* "Well, your little sister hasn't any teeth." *W.* "Well, she has got a mouth."

172. [4 yrs.] There were some silver dollars and ten-cent pieces on the table. J. took a ten-cent piece, saying, "This is a baby dollar."

173. [4 yrs.] D. was away visiting. She had been at the house at two meals. Both times there had been blueberries and milk. She saw the table being prepared for the next meal and she said, "So you are getting the blueberries and milk ready."

174. [4 yrs.] One night M. had been told a pretty story which pleased her. The next day the person that had told her the story asked her one little question about it. M. simply turned around and said, "I'm not a remembering child."

175. [4 yrs.] May, eight years old, was eating ice-cream, and H. asked for some. *Mrs. W.* "Oh, you don't want any ice-cream. Ice-cream isn't good for little boys." *H.* "Is it good for little girls?" *Mrs. W.* "Well, I guess it won't hurt them so much." *H.* "Well, why don't you give Carrie (his sister playing outside) some, then?"

176. [4 yrs.] C. was eating a large, rosy apple, when I happened to pass. He looked at me as if he thought I might like one. I asked him if that was not a potato he was eating. "No," he said, "a potato has no stem. It ain't round, either."

177. [4 yrs.] C. was sitting very still about 5 o'clock. Suddenly she said, "H., is it night?" I said, "No." She asked, "Are you sure?" I asked her why she thought it was night. She replied, "Why, I hear the crickets, and they only come at night."

178. [4 yrs.] M. cut a hole in one of her mother's sheets, and did not say anything about it. *Mother.* "M., what would you do to a little girl that cut holes in her mother's sheets?" *M.* "Well, the first time I should *scooze* her, but if she did it again I should punish her."

179. [4 yrs.] E. went down street with N., and when they got to a candy store N. bought her some candy. When they were going out of the store the man said, "Wouldn't you like some of this molasses candy? it's very fresh. I make it every night and sell it all the next day." E. didn't say anything until she got home and was preparing to go to bed, and then she said to her mother, "That man said he made candy every night and sold it the next day, and I do wonder when he finds time to sleep."

180. [4 yrs.] H. has been accustomed to see his father shave just before going to church on Sunday. He saw me putting hot water into my mug in the middle of the week and called out, "Sidney going to church."

181. [4 yrs.] J. had been very cross and sulky for about a week, and his mother's patience was exhausted. After a fit of crying, his mother exclaimed, "Well, J., do you know what will happen if you keep on being so cross? You will turn into a little bear." J. remained silent for four or five minutes and then walked over to his mother with the remark, "Well, what if I do, mother? If I turn into a little bear I'll know you are my mother, and I will never hurt you."

182. [4 yrs.] Mr. P. had been telling J. the following story, which was told by a man who had been out hunting: A squirrel ran along on the top of an old-fashioned log fence. The dog stood at the end of the fence, with his head held straight up and his mouth very wide open, barking. The squirrel ran along, and, not seeing

the dog in time, jumped down his throat. The dog whirled round and round and ran off coughing violently. The story was told very impressively and J. seemed much interested. He did not say anything for a minute. Then he said, "I believe the fence was there, and perhaps the dog was there, but, grandpa, I think the squirrel was a little fairy."

183. [4 yrs.] C., after watching a carpenter who was at work on a house, said, "Will you make me a barn? I am going to buy a horse."

184. [4 yrs.] F. often comes to Mrs. C.'s to play. He asks many questions about things in the rooms. One day he came in when she had just received a picture, a scene in winter, in which persons were represented as going to a church, some on foot, others in sleighs. F. wanted to know where they were going. Mrs. C. told him. The next day he came and noticed the picture, and looked at Mrs. C. and then at the picture and said, "Why, Mrs. C., them people haven't got there yet, have they?" He always makes remarks about that picture when he comes to the house.

185. [4 yrs.] P. had a pound of animals made of crackers. He took each animal and broke off its tail and head. I asked him what he wanted to do that for. He said, "I want to see if they can stand with their heads on the side; when they had them in front they couldn't stand at all, and I thought if I would stick them on some other place they might stand."

186. [4 yrs.] *M.* "Don't you think tigers are lazy animals?" *I.* "I don't know. What makes you think so?" *M.* "Well, they were the laziest animals in Central Park. All the other animals stood up and walked around, but the tigers didn't stand up at all."

187. [4 yrs.] *B.* "Mother, I'm going to be a *bach.* *M.* "What makes you think you would like to be a *bach.*?" *B.* "Well, if you have a girl, you've got to take her out to ride, and to dance, and to the theatre and everything. And I think I'd rather take you and sister S. out to ride, and to the other things, than a girl."

188. [4 yrs.] J. was watching a girl who was cutting out something at a table. He asked her if she climbed a tree when she was young, and if that made her neck so crooked.

189. [4 yrs.] C.'s father said that as L. was five years old he must kiss her five times for a birthday present. Hearing this, C. said, "I can be five years old sometime, can't I, papa, and then I can have five kisses?"

190. [4 yrs.] I brought out the book of Æsop's Fables, illustrated by Griset, to show him. He had, a few minutes before, turned the hour-glass and said to my brother that when the sand had run out he must go home. The first picture I showed him was that of the lion and the mouse. After looking at it a moment, he ran to the hour-glass and turned it over, saying that he was going to turn it the other way, so that he could stay longer. He seemed much interested in the pictures. One showed two grisly bears, one very large, the other a small one, standing over a man lying on the ground. He looked at it for some time, saying, first, what he said about every picture representing animals, "Would they hurt us?" I said I thought they would. After a pause he said, "That big bear wouldn't hurt the little one, would he? He would treat him just the way my mother treats me, wouldn't he?"

191. [4 yrs.] I was showing F. some pictures. We came to the picture of two men, neither of whom had whiskers. *I.* "See those men!" *F.* "Those are boys." The next picture was a man that had whiskers. *F.* "There is a man." *I.* "How do you know that he is a man?" *F.* (putting her hands up to her mouth): "He has things all round here."

192. [4 yrs.] It was snowing, and A. said to her companion, "I always keep my eyes half shut when I am out in a snow storm, because I am afraid some snow would get into my eyes and make me blind."

193. [4 yrs.] *J.* "See that man going by?" *A.* "Yes." *J.* "He said he'd catch me. Would you care if he'd catch me?" *A.* "Yes." *J.* "Should you cry all night?" *A.* "Yes." *J.* "Well, I guess your aunt would tell you to stop your noise."

194. [4 yrs.] Last Thanksgiving morning I went to this little girl's house to visit her aunt who had come home to spend Thanksgiving. Soon after I went in, she began to stand on one side of her, then the other, and said, "Oh! Aunt H. has got her nice new dress on; she can't keep it on, must she? for she will spoil it. (Smoothing her dress.) She will get it all spoiled with molasses, won't she?" Her aunt found out that she thought she was going to make molasses candy. Thanksgiving morning, a year ago, I went to their house and we made molasses candy and her aunt got some on her dress. Her aunt said that nothing had been said of making molasses candy this year.

195. [4 yrs.] H. was visiting a house where a blind man was stopping. *H.* "Say, Mr., are you dead?" *Blind Man.* "No." *H.* "Why don't you open your eyes, then?"

196. [4 yrs.] J., seeing the water running in the gutter, exclaimed, "Oh! the water is awake now; it was asleep last night."

197. [4 yrs.] Mrs. B.'s Aunt H., who lived in a neighboring town, came to visit her niece when no one but Mrs. B. was at home. The aunt told the little girl not to tell who had come, but to surprise the family when they came home. The child ran to meet the family, saying that they had company, and when asked who it was, said, "Aunt H. told me not to tell." She did not realize that she had told, until it was explained to her.

198. [4 yrs.] There was a bird standing on the telegraph wire. A. was looking out of the car window, and he saw the bird and exclaimed, "Oh, mamma, see that bird! it hasn't no place to stand on; it will fall off, won't it?"

199. [4 yrs.] *J.* "Do you know why I have the collar of my coat up?" *M.* "No; why?" *J.* "So I won't catch cold. I don't want to have the doctor again." *M.* "You don't want to be paying two dollars, do you?" *J.* "See all the things you can get for supper for two dollars! Bread and crackers,"—and he went on naming different things.

200. [4 yrs.] One day when the wind blew, A. asked me if my hat had blown off. I told her no, but that I thought it would if it didn't stop blowing so hard. She said she thought it ought to stop because the sun had come out.

201. [4 yrs.] It was a great wonder to me why, when people went up in a balloon, they did not go and look at the moon and stars and see what they were made of. I used to listen with interest when anything was said about a balloon descending, and asked if the people in it went to the moon.

202. [4 yrs.] R.'s dog had a bone. R. tried, by chasing him, to make him drop it. When the dog had lain down, R. picked up a stick. He went to the dog and held out the stick to him. The dog dropped the bone to smell of the stick, and R. tried to snatch the bone, but could not. He tried the same thing again and got the bone.

203. [4 yrs.] E.'s mother is afraid of cats and hates to touch them. E. did something and his mother said she was going to whip him for it. When she said this, E. was standing near the door and

he went out. In a few minutes he came in with the cat in his hands. He got very near to his mother and then said, "Now, mamma, if you lick me, the cat will bite you all up." *Mother.* "E., let the cat go out." *E.* "Will you lick me? If you do I won't let the cat go, and he'll scratch you if I tell him to." *Mother.* "Well, I won't lick you if you let it go." E. let the cat go and laughed for a long time, and every time since then, if she says anything to him, he will say, "Mamma, I'll get the cat."

204. [4 yrs.] H. had heard her mother, who had recently lived in Chicago, say that she wished she had gas to burn in place of lamps. One day a peddler came to her grandmother's, and as he was going away H. said to him, "Say, do you sell gas? If you do, go to my mamma, for she wants to buy some."

205. [4 yrs.] There was a very large rock by the roadside, having one side broken off and lying close to it. The boy said, "Mamma, how long has that rock been here?" *Mrs. S.* "I don't know." *Boy.* "I think it has been here ever since Christ was crucified, for you know the rocks were rent then."

206. [4 yrs.] When A. doesn't mind, her mother says, "Well, the policeman will come after you;" or, "The bear will catch you." A. was playing outside the yard and her mother told her to come inside the gate and play. I was going by the house at the time, and I heard the mother say, "The bear will come after you and eat you up if you don't." A. looked up at me and said, "Do bears live round here?" I said, "No." A. said, "I guess I will stay out here, then."

207. [4 yrs.] His brother went to his godfather's funeral, and J. cried because he could not have a ride in the hack. But he comforted himself by saying, "Never mind! when my godfather dies, he can't go to the funeral and I can."

208. [4 yrs. 1 m.] T. said, "Are those windmills over to the fair alive?" "Why did you think so?" I asked. "'Cause they move."

209. [4 yrs. 1 m.] My father has an untrained horse in the barn. Yesterday I brought F. with me to see it. The horse is wild, and while we were there kicked incessantly. When we got home my mother asked about the horse. I was telling her about it, when F. said enthusiastically, "Oh! his leg is loose."

210. [4 yrs. 2 mos.] E. likes to play on the piano, but as the noise troubles mamma she is not allowed to often. Last night she wanted to play, but mamma said she "better not tonight." E. did not say anything, but went out. I sat where I could see her and as she shut the door it seemed to me that she shut her finger in purposely. She came back crying hard. I took her in my lap and rocked her, holding her hand. Every few minutes she would say, "Oh, it's some better, but it aches awful." Pretty soon she said, "There, it does not ache any more, but it's red a little. Do you suppose your mamma would let me play on the piano because I hurt me?"

211. [4 yrs. 3 mos.] One day A. C. was looking at a picture of a cat that fell into a tub of water. Near by stood another cat and several smaller ones. A. C. looked at this picture for quite a while and asked her mother if the mamma cat threw the papa cat into the water. Her mother said, "Yes," without looking at the picture. A. C. studied the picture a little longer and then said, "Mamma, I don't think the mamma cat did do it, for I see tears in her eyes."

212. [4 yrs. 3mos.] Accidentally the skin was scraped off M.'s finger. It was shown to B. *B.* "Who did it?" *M.* "M. did." *B.* (came to me): "Did you take the skin off M.'s finger?" I told him I did. Then he said, "Well, if you did, you ought to put it on again."

213. [4 yrs. 3 mos.] My mother had a cold and spoke somewhat hoarsely. When J. heard her speak, he asked her if she was sick. She said she was not. "Well," said he, "why don't you cough and then you can speak." When my mother coughed he coughed too, and when he stopped he said to her, "Can't you talk now?"

214. [4 yrs. 4 mos.] M., who was to take part in a play, powdered her hair. About two weeks later L. was standing near her. He noticed some white hairs in her head; he said, "Cousin M., you haven't got all that white off your hair yet, and it grows worse. It grows right down into your head."

215. [4 yrs. 4 mos.] M. went to the store with me. She goes quite often, and occasionally I give her a cent. While we were waiting she said, "Look at tutti frutti gum." Isaid nothing. Then she said, "I like it." *I.* "Do you?" *M.* "I wish I had some." A moment's silence. *M.* "If you'd give me a cent, I'd get—some—wouldn't I?" *I.* "I guess so." *M.* "You ain't going to give me none, are you?" *I.* "I guess not." *M.* "You ain't got none, are you?" "No." *M.* "Well, then, I guess you hain't goin' to give me any."

216. [4 yrs. 5 mos.] H.'s uncle has a tame owl, and her mother said to me, "I don't see what S. wants of that old owl." *H.* "Why, he must have something to love."

217. [4 yrs. 5 mos.] *M.* "I just saw B.'s (a little girl she plays with) aunt, and she is an old maid, I know." *I.* "How do you know she is?" *M.* "Why, because she has gray hair and she don't wear any crimps."

218. [4 1-2 yrs.] One morning T.'s papa was soldering, and T. enjoyed watching him. In the afternoon T. accidentally broke a blossom from his mother's favorite plant. She felt very sorry, but he soothingly said, "Can't my papa solder it on?"

219. [4 1-2 yrs.] One day I.'s mamma got some bad eggs from the store. She was complaining about the eggs, and I. heard her. He asked, "Mamma, what kind of hens lay the bad eggs?"

220. [4 1-2 yrs.] A. is very fond of having any one pay a great deal of attention to her. One day she was left alone with her Uncle W. He was busy reading and so did not say very much to her. A. kept asking him questions, but he just barely answered her. At last she said, "Uncle W., you don't care anything about me! There don't anyone care anything about me!" Her Uncle W. did not say anything to her. In a few minutes she said again, "There don't anybody love me, and I'm going to die." She threw herself on the floor and said very emphatically, "Die!" "Why don't you die?" "Die! I tell you!" When she found out her Uncle W. wasn't going to pay any attention to her, she got up and seemed to feel all right again.

221. [4 1-2 yrs.] C. was going to accompany mother, as she was going with the dinner. He expected to go to work soon. Looking at the pail C. said, "Mother, won't you need to buy a larger pail?" *Mother.* "Why, dear?" C. 'Because, won't two mans eat more than one man?"

222. [4 1-2 yrs.] The wind was blowing very hard, and G. said, "Auntie, what makes the wind blow?" *A.* "O, I can't explain it to you. Perhaps you will understand when you get older. *G.* "Wouldn't it be nice if we could tell what makes everything and what it's for?"

223. [4 yrs. 7 mos.] "S., do stop talking; you will talk me to death." *S.* "I like to talk; if I didn't talk I wouldn't know."

224. [4 yrs. 8 mos.] C. was looking at the pictures of the animals of the different countries in an old geography. These are favorites of hers, as she knows the names of the animals. *C.* "The animals

of Asia are more ferocious than those of Africa." *Mrs. H.* "Where would you rather live, Asia or Africa?" *C.* (after thinking a minute): "I think I should prefer Africa."

225. [4 yrs. 8 mos.] I. was going up street one afternoon with her mamma, who was going to buy shoes both for herself and me. But before it was time to go, the little girl was very willful and disobedient, and was told that she could not have her shoes that afternoon because she was naughty, and must be punished. In spite of coaxing and crying her mother was firm. In a little while it commenced to rain and continued to do so all the afternoon. I. stood for a while quietly looking out of the window. At last, she turned to me and said, "Mamma can't go up street herself now, and so she will be punished just as much as me, if I was naughty."

226. [4. yrs. 8 mos.] In a store there were some plaster images of some dogs in various positions. *I.* "See those dogs, F." *F.* "Yes; are they alive?" *I.* "No." *F.* (as if she did not believe it): "But they are standing on their feet."

227. [4 yrs. 11 mos.] G. has been sick, and every time the doctor came to see her, he left some pills. The other day the doctor came to the baby and did not give G. any pills. G. stood very still by the doctor, and after he went out she said, "Doctor is getting stingy, he didn't give me any pills."

228. [4 yrs. 11 mos.] R.'s mother noticed her fixing some straw in a wooden box, but did not know what she was doing it for. About half an hour after, R. ran in to her mother and said, "We'll have lots o' weggs for Weaster." Her mother said, "Will we? Where are we going to get them?" *R.* "I put a straw nest up in the corner of the garden, near the fence. Mrs. -- can't see it, 'cause it's in the corner with a wegg in it. Her hens is going to lay all the weggs in it." *Mother.* "But Mrs. — will have you arrested for doing it. She will tell the policeman." *R.* "Could she arrest me for that?" *Mother.* "Yes, and put you in the lock-up." R. did not say anything, but her mother saw her a few minutes after, stealing along with the box under her apron, so Mrs. — could not see her.

229. [4 or 5 yrs.] H.'s father told him he might order anything he wanted when the store-man came. H. told the man to bring him some court-plaster. When his father heard what he had ordered, he asked H. if he had cut himself, and he said, "No, but I might sometime."

230. [6 and 4 yrs.] While at the dinner-table one day, something was said about whistling, and F., who was about six years old, said, "I can whistle." Her little brother, two years younger, who had not said anything for quite a little while and appeared not to be listening to what was said, looked up and said very soberly, "Why don't you, then?"

231. [4 yrs.] Two little boys were together. A hay-cart had just passed by, and some of the hay had fallen on the ground One of the little boys picked it up. He saw a horse standing near. He was afraid to give it to him at first, but after a while he went up near to the horse and said, "Horsey, do 'om want something good?" The little boy became bolder at every step and as he reached up the hay to the horse he turned to the other boy and said, "He thinks it's tandy."

232. [5 yrs.] When B. and his mother were going by a large woolen mill, near which a tar sidewalk was being made, he exclaimed "O mamma, I smell tar; I guess they are making tar drops in that mill. I will come down here to get some tar drops the next time I have a cold."

233. [5 yrs.] *L.* (coming into the room where her mother was: "That boy out there will never see God." *Mother.* "Why not?" *L.* "Oh, he's been saying bad words, and he can't have a pure heart." She had been learning the verse, "Blessed are the pure in heart, for they shall see God."

234. [5 yrs.] J. and I were watching some men working on the top of the house. One man had a rope by which he let his companion slip down the sloping roof to mend the broken slates. *J.* "If the man let go the rope and the other man should fall down and get killed, would the man that let go the rope get hung?" *I.* "Well, I don't know." *J.* "I mean if he let go on purpose, you know; if he really meant to let the man fall." *I.* "I don't know; he might." *J.* "Well, I think he ought to be, anyhow."

235. [5 yrs.] As I was coming to school the other day, three boys about five years old were picking up leaves by the roadside. One of them looked down the road and immediately stopped and put his hands behind him. They asked him why he did not help, but he would not tell them. They then said, "We ain't going to work if you ain't." "Well," he said, "I ain't going to get caught; don't you see that policeman coming up the road? My father told me never let a policeman ever see me doing anything.

236. [5 yrs.] F. went into a store and bought a *Boston Record* for his father. When his father had finished reading the paper, F. asked if he might have it. His father said that he could. F. went back to the newsdealer's and said, "Papa's read this paper and I want the money back." F. was a favorite with the newsdealer, and he gladly handed him back the penny; and the boy went home enjoying the stick of candy he had bought.

237. (5 yrs.) A few days before Christmas, I.'s doll-carriage was in the parlor, and her mother told her to carry it up stairs. She said, "Yes, I will, mamma, and I'll hide it way off where Santa Claus can't find it; 'cause if he sees it, maybe he won't leave me any presents, but will give them to some other little girl."

238. [5 yrs.] M.'s cousin was showing her an album. Among the pictures was M.'s uncle when he was a boy. She told M. it was Uncle —. "Oh," said M., "I never knew he was so small as that."

239. [5 yrs.] A. had played with dolls a great deal and knew that they were filled with sawdust. A man had been killed at a railroad crossing. A. had heard people telling about it and had heard them say the man had been badly cut. Soon after, A. was telling about it, and he said, "The man was cut, and all the sawdust spilled out of him."

240. [5 yrs.] J.'s mother had been sick for a few days and was sitting up this afternoon. She was saying, to a friend who had called, that she was tired of sitting up and lying down, when J., who was sitting near, said, "Well, why don't you stand up?"

241. [5 yrs.] P. was looking at a picture of me when I was a young girl. *P.* "Who is that, grandma?" *I.* "That's me." *P.* "Why, no, that's mamma, ain't it?" *I.* "That's grandma." *P.* "Well, anyway, that's a girl and you are an old woman."

242. [5 yrs.] One day B. went into a house where they were frying pork. He heard the noise, but did not know what it was. At the same time he heard the cat cry. When they came out to go home, he said to his mother, "Did you know they were frying the cat's tail?"

243. (5 yrs.) One evening at meeting, B. sat directly back of me, with her father and mother. The minister was talking, and as he went on spoke faster. B. looked up to her mother and whispered, "He's mad."

244. (5 yrs.) M. was sitting at a window watching a funeral going by. I asked her what the hearse was. "Somebody died," she answered, "and they're going to get buried up." I asked her why they were going to be buried up. "They died from eating green grapes," she said. Her mother had told her that if she ate green grapes she would die and be buried up.

245. [5 yrs.] H. was swinging on the gate. A teacher at Mason street came by and stopped to speak to him. "When are you coming to school, H.?" she asked. *H.* "I geth [guess] not never, I'm thuch a little rathcal [rascal].

246. [5 yrs.] R. wanted to have me play checkers with him. We played three-fourths of an hour, and I purposely let him jump my men. He enjoyed picking the men from the board. I showed him how to get a king and how to "crown a king." I only beat him once. He was delighted and wanted to play longer, but I saw that he was getting tired, so stopped playing. In a few moments he surprised me by saying, "You let me beat." *I.* "What makes you think that?" *R.* "You moved your men up near mine," was the quick reply.

247. [5 yrs.] P. has a baby brother and has to rock the cradle. His aunt has just gone to Providence and P. wanted to go with her, but when his aunt told him he might go he said, "No, P. mustn't want to go; for if he does, when mamma says, 'Now, P., you must come and rock the cradle,' there won't be anyone to come and rock the cradle."

248. [5 yrs.] Mrs. H. was afraid that W. had the chicken-pox, and was telling her husband, when T. heard her and said, "Yes, mamma, I think he has the chicken-pox, because you know last summer he went into grandma's barn with the chickens."

249. [5 yrs.] One of W.'s neighbors had a child, which, although it was seven years old, was as helpless as a baby three weeks old, and not much larger. One day he went in to see it and came home very much excited and said to his mother, "Mamma, will Mrs. G.'s baby never grow up?" *M.* "No." *W.* "Will it ever walk?" *M.* "No." *W.* "And never talk?" *M.* "No." *W.* "And never grow up into a boy?" *M.* "No." *W.* "And never grow up into a girl?" *M.* "No." *W.* "And never grow up into a woman?" *M.* "No." *W.* "And always be a baby?" M. "Yes." *W.* "Then why don't they kill it?"

250. [5 yrs.] *Mrs. W.* "Do you know when your Aunt Bertha is going to be married?" *M.* "Pretty soon, I should think; he is there every night."

251. [5 yrs.] A. had told Miss B. the story of a dog which had been told him and which he liked very much. *Miss B.* "That was a smart dog. I don't know but some dogs know more than we do." *A.* "Yes, indeed! We can't bark."

252. [5 yrs.] H.'s little brother was eating and H. said to him, "Why, F., you are eating worms." His father, very much surprised, asked him what he meant. "Well," he answered, "my teacher said yesterday that hens eat worms and lay eggs, and F. is eating an egg, so he must be eating worms."

253. [5 yrs.] M. and J. looking on while the corn was being husked for dinner. *J.* "What color is that corn?" *M.* "White, of course, you don't think it's blue, do you?—don't you know milk?" *J.* "Yes, I do know milk, but—green corn, they say."

254. [5 yrs.] There was sickness in a neighboring family, and his mother was preparing food to send in. H.'s comment was, "The idea of sending pies and things to anybody who can afford to have

gas in their house!" He saw tripe for the first time, and smelling of it asked, "Is that what they make cod-liver oil out of?"

255. [5yrs.] This boy went out in the pouring rain and stood in the middle of the road. He had no hat on. *Mother.* "E., come in here, out of the rain." *E.* "No, I'm going to stay out here till I'm soaked, so I'll grow. I ain't going to wear dresses any more. I want a pair of pants."

256. [5 yrs.] R. came into the house eating a horse-chestnut. *Grandma.* "Well, R., if you eat that horse-chestnut you'll die and go to heaven with your mother, and then I shan't have any R." (His mother was dead.) *R.* "Well, I'll go out and get four horse-chestnuts, one for grandpa, one for you, one for Aunt H. and one for me. I'll eat mine first, then I'll die and go up to heaven first. Then grandpa 'll eat his and he'll die and go to heaven, then Aunt H. 'll eat hers, then she'll die, then you'll eat yours and we'll all be up there together. Won't that be nice, grandma?"

257. [5 yrs.] M. H. had a ten-dollar gold piece for a Christmas present, and her mother put it in the bank for her, telling her she could have it when she became twenty-one. *M.* (after thinking awhile): "Mamma, I don't believe I shall live to be twenty-one. If I don't, you can have my one thousand pennies to spend. Perhaps it's just as well it ain't in the house, for you'd be borrowing it and borrowing it, and never give it back again. If you do have it to spend, you can give papa a little."

258. [5 yrs.] "Papa, is Miss J. (aged 23) a lady or a little girl?" Her father answered her indirectly and no more was said about it. That day Miss J. and A. played with dolls, etc., on the floor, and the next morning at the breakfast table, A. said, "I've found out, papa; she's a little girl."

259. [5 yrs.] M. heard her father say something about the transmigration of souls, in which he mentioned the dog and cat. Soon after she saw several dogs, and ran to her mother saying, "Mamma, were you ever a dog?"

260. [5 yrs.] *Child.* "My teacher was sick and her sister taught school while she was absent. The teacher's sister was cross, and when the teacher came back she was cross too, and I guess she caught it from her."

261. [5 yrs.] *Mother.* "In a little while E. (two years old) will be old enough to go to church with us. Then I guess we will have to hire a pew nearer front." *Child.* "I don't see why, he is no better looking than the rest of us."

262. [5 yrs.] E. was left in charge of a lady while his mother went up street. Lady said, "E., you must come in now, it is rather cold." *E.* "I guess I won't; you ain't the mother of me."

263. [5 yrs.] *Child.* "I don't know why God makes it thunder, but I wish I did." *I.* "Well, I'd like to know why He does." *Child.* "Well, He does it to make the trees green; that's what He makes it rain for, too." *I.* "He makes it rain sometimes when He doesn't make it thunder." *Child.* "Well, when He wants to kill anyone He makes it thunder. Anybody that's out when it's thundering will be killed, but we're in the house and won't be killed. I wish God wouldn't make it thunder, don't you?"

264. [5 yrs.] A. was visiting down stairs. *Mamma.* (at top of stairs): "A., you must come home now." *A.* "I don't hear, mamma. Do I, Aunt L.?"

265. [5 yrs.] Mrs. G. asked F. to come to see her and stay to supper. He always wants to tell what he has to eat when he gets home, but his folks do not allow it unless he has been to a party.

When he sat down to the table he looked around and said, "I guess I shall have to call this a party."

266. [About 5 yrs.] *Mrs. R.* (to E.'s mother): "How much E. is going to look like B.!" *E.'s mother.* "Yes, she is growing more like her every day, in looks and actions." *E.* "No, Mamma J., I don't look like B.'s picture and I don't want to." *Mrs. R.* "Why E., dear, if you look like B. you will be a pretty child." *E.* "I know; but B.'s died; and if I looked like her, God might die me, too."

267. [About 5 yrs.] Mrs. S. had come with her little daughter A. to see Mrs. L. A. had the whooping-cough, and Mrs. L. did not wish to have O., her son, go into the room with A., as he had never had that disease. When Mrs. L. heard O. come in from his play, she said, "Don't come in the parlor yet." *O.* "Why not?" *Mrs. L.* "Because A. S. is here and she has the whooping-cough." *O.* "I don't care." *Mrs. L.* "You might catch it and be sick." *O.* "Then what you in there for?"

268. [About 5 yrs.] *M. D.* "Wouldn't you wish you were dead?" *T. M.* "Why?" *M. D.* "Because you can buy candy when you die." *T. M.* "How can you?" *M. D.* "They put a cent on your eyes." This little girl had just been to see a playmate of hers who had died.

269. [5 yrs. 1 m.] G. has been going to school but a few days. She came home the other day and said, "One little girl was naughty and teacher sent her home. She (teacher) ought not to do that, for she could go home and have fun."

270. [5 yrs. 3 mos.] I had been drawing a picture of a house with a well near it. W. came in, and after looking at it a minute, pointed to the well and said, "What's that?" *I.* "A well." *W.* "Where's the cat?" I did not know what he meant at first, but I happened to think that some time before this, he learned the rhyme, "Ding dong bell, the cat's in the well."

271. [5 yrs. 3 mos.] *Child.* "Why don't you come to see me? Won't your mother let you?" *I.* "No." *Child.* "Why don't you cry and kick? then she will let you go." *I.* "Do you do that?" *Child.* "Yes, mother says, 'Well, go 'long then.'"

272. [5 yrs. 5 mos.] P. and I were at the table. *P.* "Which had you rather eat, a cat or a rat?" *I.* "Well, I don't know, I guess there wouldn't be much difference." *P.* "Yes, there would. There'd be ever so much more cat to eat than rat."

273. [5½ years.] S. had a rag doll which he always called Shakespeare. His mother thought he called it Shakespeare because they had a Shakespeare-calendar. One day she said, "S., what makes you call that doll Shakespeare?" S., holding the doll up, said, "Why, don't you see how his legs shake?"

274. [5 yrs. 7 mos.] *F.* "Is this sponge an animal, mamma?" *Mother.* "Yes." *F.* "I can see where they shot him" (pointing to one of the largest holes in the sponge).

275. [5 yrs. 7 mos.] R. was asking me the other day what made the sun go around. I told her it was the earth that went around and not the sun, and that she would understand it when she was older. Sunday she stood at the window watching the clouds. She appeared to be thinking of something. At last she said, "Those clouds don't really move, do they? It's just us that move, same's when we go in the cars and everything goes by."

276. [5 yrs. 8 mos.] J. saw a lame boy on the street yesterday, and as soon as the boy was out of sight J. began to imitate him. *Observer.* "You should not do that, J., it is not right." *J.* "He didn't see me." *Observer.* "No matter." *J.* "I wish't I was

lame." *Observer.* "Why?" *J.* "Cause I wouldn't have to chase in the hens at night."

277. [5 yrs. 9 mos.] F. wanted very much to have her mother go to church one evening. Her mother told her she would see about it. Shortly afterward I heard F. saying to her sister, "Oh E., mamma says she'll see; and the other day I asked her if she'd go up street and she said she'd see, and she went, and I asked her if she'd go up to G.'s and she said she'd see, and she went; so must be she'll go to-night."

278. [5 yrs. 10 mos.] C. wanted to go out in the yard to play, but his mother told him he must stay in the house, and he began to cry. His mother said, "Charlie, if you do not stop crying, I will whip you." "Well, now, mamma, that will only make me cry more," said C.

279. [5 yrs. 10 mos.] Something had been done and no one knew who did it. The children were talking among themselves, and trying to lay the blame on some one. One child was suspected. D. said, "I will ask her, and if she turns red, then she did it."

280. [5 yrs. 10 mos.] C. urged her mother to go to the barn with her to see some little pigs a few days old. Her mother said that she did not want to see "the little pink things." After a period of silence, C. said: "Mamma, don't you think that pink is becoming to little pigs?"

281. [5 yrs. 10 mos.] *J.* "Do all the butterflies belong to the same family?" *M.* "I do not know." *J.* "Yes, they do, but they don't all live in the same house."

282. [5 yrs. 11 mos.] C. said, "Does everybody go to heaven when they die?" No answer was made to him. Finally, he said to himself, "Well, Mr. B.'s horse didn't go to heaven when he died, 'cause I saw him in the pasture all dead."

283. [5 or 6 yrs.] Five or six boys were beginning to play theatre, and they all wanted to be actors. One of the boys said, "We can't all be actors; if we are, nobody will see us."

284. [5 to 10 yrs.] I had heard the riddle about the candle. "The longer she stands, the shorter she grows." I did not want to stand any more than I could help, lest I should not grow or should become short.

285. [6 yrs.] A young lady visiting W.'s sister remarked to her in his hearing, "W. is a very attractive child. What a pity that he has red hair. If it were not for that, he would be really beautiful. He soon left the room, and his mother found him at the kitchen sink scrubbing his head with soap-suds. *She.* "What are you doing, Walter?" *He* (indignantly): "Washing the red off." Before this, he had never been sensitive about the color of his hair, but now he grieved over it and was angry at the most innocent reference to his hair or even to his head. A few weeks afterwards, a caller noticed his hair and said, "What lovely auburn curls W. has! I always admired that color of hair, and he has so much!" He seemed delighted, and held his head higher than usual. The next time company was present, he edged up to his sister and whispered, "Say, J.! Say something about my hair."

286. [6 yrs.] M. felt bad because her father was taking away some little kittens. *Mrs. H.* "But the kittens have not got their eyes open. They don't know anything yet." *M.* "But their mother does, and she feels just as bad as you would if something came and took us. It's wicked. It's cruel."

287. [6 yrs.] A. asked me if pigs ate egg-shells. I told her no, I guessed not. Then she said, "M. puts an egg in the coffee and the

coffee-grounds are put in the swill. Then the pigs have to eat them."

288. [6 yrs.] We have a box to put letters in before carrying to the post office. M. saw it and said, "Why! you don't have to carry your letters to the post office any more, do you?" She looked at it and thought for a few minutes, then said, "Well, I don't know but that you do have to take your letters to the post office, because they couldn't be sent off on the cars from here."

289. [6 yrs.] There were two cows in a field by the road-side where there was no fence. M. was afraid to pass them, and cried. I asked her what made her afraid of them, and she said, "They looked at me so queer and I had this in my pocket;" and she held up a piece of red silk.

290. [6 yrs.] A. was away from home and was shown some ducks a few days old. She said, "Why don't you have their feet unsewed?"

291. [6 yrs.] F.'s teacher told the school that the fox and the dog were related to each other, something like one cousin is to another. She then said that the dog sometimes chased the fox. F. said suddenly, "Kind of funny that he'd chase his own cousin!"

292. [6 yrs.] I was walking along the street with J., and as it was cold, he could see his breath. After looking at it awhile, he turned to me and said, "Look! I am good, 'cause my breath goes up to heaven."

293. [6 yrs.] I overheard the following conversation: *M.* "Can it snow before Thanksgiving?" *Mother.* "Perhaps." *M.* "Will it snow before Thanksgiving?" *Mother.* "It may." *M.* "Well, it did last year, didn't it?" *Mother.* "Yes." *M.* "Well, then, it'll have to snow this year."

294. [6 yrs.] J. was watching his mother preparing the turkey for dinner. The heart of the turkey had two seams across it. When J. saw the heart, he noticed the seams and said to his sister, "Oh T., this turkey told two lies; look where they cracked his heart."

295. [6 yrs.] I was dividing some candy with some children the other day and forgot to give some to T. C. She waited a little while without saying anything; then she came over to me and looked in the bag and did not say anything then. About a minute after looking in the bag, she said, "If there is anyone in the room who wants to put any candy in my pocket, it is empty and waiting for some." I gave her some candy and she laughed, saying, "I kind o' thought that would make you give me some." I told her I did not mean to forget her in that way, and she says, "Probably you didn't, but I got it all the same."

296. [6 yrs.] I. troubled her mother, Mrs. M., by chewing gum. Mrs. M. told her that gum was made from grease. I. took the gum from her mouth, and her mother thought she would not chew it any more. But after thinking a few minutes, I. said, "Lard is grease, and doughnuts have lard in them. It's good;" and she began to chew the gum again.

297. [6 yrs.] T. H., seeing some Guinea hens for the first time, asked, "If those hens had false faces on?"

298. [6 yrs.] In the work-shop, John was lifting himself from the floor by taking hold of the vice. *I.* "Why, you can lift yourself up from the floor; I can't." *J.* "Course not, you ain't strong enough." *I.* "Why, I'm as strong as you are." *J.* "Yes, but you weigh more."

299. [6 yrs.] *Child.* "Give me an apple, M." *I.* "What do you want it for?" *Child.* "Because." I gave her a pear instead, and she began biting the pear without looking at it. *Child.* "This

isn't an apple." *I.* "What is it then?" *Child.* "It's a pear." *I.* "How do you know it is a pear?" *Child.* "Because it hasn't any core."

300. [6 yrs.] *Child.* "Say, looker what he just said, 'The moon is an angel.'" *I.* "Well, what is then?" *Child.* "I don't know." *I.* "How do you know but it is an angel then?" *Child.* "Course it ain't. The angels don't be dancing around up there, 'cause my teacher told me the other day to try and be quiet as an angel."

301. [6 yrs.] His little brother stuck his finger into his (E.'s) eye. It hurt him badly, and he came in crying, but trying hard not to. Some one asked him about it, and he said, "He did not mean to do it. I came in so he would not know it hurt much."

302. [6 yrs.] *R.* "Mamma, what do you do after I go to bed?" *Mrs. M.* "I should think you would ask, with those holes in your stockings to be darned." *R.* "Would you like to go to bed when I do?" *Mrs. M.* "Yes." *R.* "Well, if you weren't married, would you?" *Mrs. M.* "Yes." *R.* (after thinking awhile, to his sister some years older): "Sister M., I advise you never to get married."

303. [6 yrs.] *Child.* "Mamma, why don't you wear glasses? Mrs. S. wears them all the time." *Mrs. B.* "Why does Mrs. S. wear them all the time?" *Child.* "I don't know. I suppose to keep her eyes from getting wore out."

304. [6 yrs.] *H. M.* "I'm going to be a smarter man than my father." *Mrs. O. G.* "Why do you think so?" *H. M.* "My papa didn't live near the school and I do, and besides, he had to go to work when he was little, and you see I go to school every day.

305. [6 yrs.] A tall colored man was passing by, and five little boys, who were standing near, began to talk about him. *First Boy.* "Ain't he tall!" *Another Boy.* "Wonder how they will put him in a coffin when he dies." *Boy.* "They'll double him up." *Boy.* "Well, anyway, the hearse won't be long enough."

306. [6 yrs.] B. was in her father's office, and pointing to a large chair which her father was accustomed to use, said, "Is that your chair, papa?" Her father said to her, "No, that chair belongs to the state of Massachusetts." After a pause, B. said, "I'm your little girl, ain't I, papa?"

307. [6 yrs.] L. was jumping rope. She never had been to school. *I.* "Well, I should really like to know what you are doing." *L.* "Jumping rope, of course." *I.* "Do you like to jump rope?" *L.* "Yes. But I forgot, I mustn't jump where you can see me, for you are a teacher, and teachers won't let little girls jump rope." *I.* "Why not?" *L.* "Oh, I don't know. They say it'll make them sick, but I know better. It don't make me sick a bit and I have jumped lots."

308. [6 yrs. 1 m.] We had been eating supper, and N.'s mother was clearing away the dishes. *She.* "Well, N., you have got about a peck of crumbs around your place." *N.* (after waiting a minute when he seemed to be thinking very soberly): "Why, mamma, I don't believe there was a peck of things to eat on the table tonight."

309. [9 yrs. 2 mos. and 6 yrs. 1 m.] *J.* "Have mosquitoes bones?" (No one answered.) *J.* "Our teacher told us about some animal that lived in the water and had none." *W.* "Have flies?" *J.* "No." *W.* "Then mosquitoes has none, for they're a much smaller animal."

310. [6 yrs. 2 mos.] *B.* "Mamma, I want to have my second teeth." Her teeth are very poor and ache very often. *Mother.* "Well, you must wait till yours fall out, then your second teeth will grow." *B.* "No, your second teeth don't grow; the dentist puts

them in." *Mother.* "Why, no he don't." *B.* "Yes, he does, mamma; he put in yours." Her mother had false teeth.

311. [6 yrs. 4 mos.] H. had a bad habit of wanting to know the name of everything he ate and how it was made. One day his mother asked him if he would like a piece of pie. "What kind of pie? How do you make it?" was asked. "Why, it is magpie," answered his ma. H. took some, and while eating, a seed happened to be in the pie (for it was apple pie), and he took the seed out of his mouth, saying, "Well, I have one of the magpie's eyes. Who has the other?"

312. [6 yrs. 7 mos.] N. was putting her doll to bed. She took out the pillow from the doll's cradle and laid the doll down without a pillow. I asked her if she had forgotten the pillow and she said, "You don't suppose I want my doll to have round shoulders, do you?"

313. [6 yrs. 7 mos.] The teacher had been talking to the children about being polite, and told them that when any one handed them anything, they should say "thank you!" If, going by another pupil, they accidentally hit her, they should say "pardon me." A day or two after this, A. came home and said, "My teacher is awful impolite. Today when she went by me, she kicked me and didn't say 'pardon me;' and when she dropped her handkerchief and I gave it to her, she didn't say even 'thank you.' I shan't go to school to her any more.'"

314. [7 yrs.] H. was told that it was the birthday of a member of the family, and seemed surprised when she refused to tell him her age. The next morning he said, "Mamma, how old is Miss H.?" *Mother.* "It is not polite to ask her age when you know she did not wish to tell you." *Harry* (after a pause): "Then why does she ask me how old I am?"

315. [7 yrs.] On a hill near where I lived was a rock with a crack in it, and in summer a brook used to flow from the crack. Some one told me that the water was rock-water and that it flowed out of the rock. I believed it, and always associated that rock with the rock which Moses smote when the children of Israel were journeying to the promised land.

316. [7 yrs.] I showed E. a picture of a little girl about twelve years old. E. looked at it a long time and said, "She has a pretty dress on." She turned the picture over and looked on the back of it. I asked her what she was looking on the back of the picture for. "Well," she said, "I wanted to see if her dress was buttoned in the back."

317. [7 yrs.] F. came into the store for some snuff and was to receive five cents back in change. I gave him a five cent piece. He looked up at me and said, "Ain't you got any pennies?" I said, "Yes, but why, won't that do?" and he said, "Well, when I am giving it to my grandmother, I can keep a cent, and if I gave her the other, she wouldn't give me any cent then."

318. [7 yrs.] *B.* "Aren't there any Chinamen in your school?" (meaning this school). *Myself.* "No." *B.* "Why aren't there any?" B.'s grandma asked him if he knew where China was. *B.* said, "Why it's east." *Myself.* "East of what?" *B.* "I don't know, but it's east." His grandma asked him if he thought he would get to China if he went towards the east where the sun rises. *B.* said, "No, of course I couldn't, 'cause the sun goes right along with you."

319. [7 yrs.] *H.* "I think I can tell you something about animals." *I.* "Well, what is it?" *H.* "I have thought what makes animals stick up their tails when men go to hunt them with a lasso

or a gun. If they sticked them straight out, the men could catch hold of it."

320. [7 yrs.] L. had had his hair cut. When he got home, he went to his grandmother's room and told her that the barber had put pepper-sauce on his hair.

321. [7 yrs.] While passing a cotton mill that was being repaired, *T.* said, "Say, M., this is going to be a silk mill." *I.* "Who told you it was going to be a silk-mill?" *T.* "One of the boys." After a short pause, *T.* said, "M., where will they keep the worms?" *T.* "What worms, T.? What do you think they do with worms?" *T.* "Why, they can't get silk without worms; my teacher said so; she said we get silk from the silk-worm; and that all the nice silk dresses we see every day come from worms."

322. [7 yrs.] Preparations were making for punishing J., when he remonstrates, "Father, how would you like it to have a giant take you and treat you as you do me?"

323. [7 yrs.] *H. M.* "The steam from one gallon of water would blow up this house, and I don't know but what it would blow up the world." *Mrs. O'G.* "I don't think it would blow up the world." *H. M.* "I think it would. When you put a drop of water on the stove, see all the steam it makes, and then just think of putting a gallon on. Don't you think it would blow up the world?"

324. [7 yrs.] Miss N. was giving a number lesson something in this way: "Once a rich man counted his money and put down a figure for every dollar, but when he got as far as ten, he had used all the figures and didn't know what to do." At this point, J. raised his hand and said, "He might carry a revolver."

325. [7 yrs.] Miss P. said to E.'s older sister, "How you grow, A.!" Then turning to E., she said, "Don't you wish you was as large as A.?" *E.* "No, for I shouldn't be cunning then."

326. [About 7 yrs.] My sister had the mumps on both sides. I took them from her and had them on one side. I sent word for my cousin to come and play with me. "I had got the mumps. E. had them on both sides. I took them from her and had got them on one side. If she took them from me, she wouldn't have them on either side."

327. [About 7 yrs.] There were two stuffed birds, an owl and a duck, in a show window. A little boy stood looking at them. I said, "I wonder if those birds are alive." *He.* "No, they are dead." *I.* "But how can we tell? They look as if they were alive." *He.* "If they were alive, the owl would eat the duck."

328. [About 7 yrs.] I used to live opposite the school house when I was in the second grade. At recess I very often asked if I could go home for an apple. One day the teacher refused to grant my request. She said, "If you keep on you'll be a barrel of apples." I thought she meant what she said, and I was so frightened I stopped eating apples for a long time. I longed to eat an apple after this, and I used to cut out all the seeds and then eat the rest. I did this because I said, "If I don't eat the seeds, there won't be any apples."

329. [7 yrs. 1 m.] F. was looking at the picture of a pump which I had drawn. *He.* "Auntie, can you put some water in that book?" *I.* "No." *He.* "Then you can't draw any water with that pump. It won't do you any good, will it?"

330. [7 yrs. 2 mos.] *J.* "Mamma, can I have another apple?" *M.* "My child, what are you made of that you can eat so much?" *J.* "The Sunday-book says dust, for my teacher told me so." Nothing was said for a few moments, when J. called to her mother (then in another room) saying, "If I am made of dust, I should think I'd be all mud when I've drinked water."

331. [7 yrs. 5 mos.] *Mother.* "B., there are thirty cents to buy some groceries with. I want one dozen of eggs and a can of squash. Both will be twenty-nine cents. How many cents are you going to bring back?" *B.* "One." After B. had returned with the groceries she gave her mother eleven cents. *M.* "I thought you were going to bring back one cent; how does it happen there are eleven?" *B.* "Why, the eggs was fourteen cents, and I told the man that five cents was 'nough to pay for a little can of squash, for my mother had given away whole squashes for nothing; and he believed me. So, you see, I paid nineteen cents for all, and brought back eleven."

332. [7 yrs. 6 mos.] In the reading lesson it was said that birds, even when they are asleep, keep on their perch or branch without falling off. M. raised her hand and said, "I should think when they are asleep they would dream and fall off."

333. [7 yrs. 11 mos.] This little boy had been told that he must not plague his little baby brother, because it was making him have a bad temper. He lay on the lounge a little while, and then suddenly said, "Mamma, did L. have a temper when he was a baby?" L. is his older brother, who has rather a fiery temper.

334. [7 or 8 yrs.] *Miss S.* "If I had two sleds, to how many boys could you lend them?" *Boy.* "Two; I could use one myself, and let two other fellows have the other one."

335. [7 or 8 yrs.] R. was looking at my geology; he finds the picture of an elephant's skeleton, and asks what that is. "An elephant." "Oh, yes, an elephant without its clothes." After, he said, "Skin is clothes."

336. [7 or 8 yrs.] A lot of chairs were being unloaded at a certain house. A little boy standing near asked the man if anybody was dead.

337. [7 or 8 yrs.] When my brother was about seven or eight years old, he went to school to a teacher who was in the habit of pulling the boys' ears a good deal. My brother did not want his ears pulled, so he got a large piece of tallow, and kept it under the shed, with which he used to grease his ears every morning and noon. He did this for quite a while before we found it out. At last my mother went out into the shed one day, and found him there greasing his ears. She asked him what he was doing that for, and he said, "So if the teacher tried to pull his ears, her fingers would slip off and she would fall down."

338. [7 and 9 yrs.] During the day a little boy had a fit in the school-yard. When they came home they were heard saying: *W.* "Come, T., play you have a fit." T. closed his eyes and fell into W.'s arms. *Mother.* "Didn't you know it was a sin to play anything like that?" *T.* "Which commandment did she break?"

339. [8 yrs.] The family were talking about the death of Mr. C., when G. said, "If God called me, I'd go." Then looking up, she said, "Why! I'd have to go; I couldn't get out of it, could I?"

340. [8 yrs.] I had asked J. what grade he was in at school, and he had told me that he was in the second grade. *J.* "The first grade is the hardest there is, though." *I.* "What makes you think so?" *J.* "'Cause when you go to school first you don't know anything, and you have to learn it all, and when you get into the second grade you know it all, and it isn't so hard."

341. [8 yrs.] In the reading lesson it was said that it was wicked to kill birds. E. said, "It isn't wicked to kill crows, because they do hurt."

342. [8 yrs.] G. said, "Isn't it queer, Aunt N., when you find anything you've lost, it is always in the last place you look?"

343. [8 yrs.] One Sunday in my Sunday school class, I asked this question: "In what form did the devil tempt our first parents?" *J.* "In the form of a fish." *I.* "Why do you say in the form of a fish?" *J.* "Because he had to come from the sky, and the sky is full of water." *I.* "Do you think there is very much water in the sky?" *J.* "Oh! lots and lots of it, for you know it rained last week, and it never rains until the ponds and brooks run over."

344. [8 yrs.] There was some sage cheese on the table. C. said, "Why, mamma, we can't eat that; it isn't ripe yet."

345. [8 yrs.] When the children write their spelling, Miss G. puts a colored star on cardboard for the division having more words spelled correctly. N.'s division had not so many words as the other. He said, "I don't care if that division does have more stars. If my words are all right, I am just as smart as any one."

346. [8 yrs.] The children were reading out of their reading books a piece called "A Drop of Water." The teacher asked where the water came from when it rained. *B.* "It comes from the sky." *Teacher.* "How did it get there?" *B.* "It's always there. God made it in the first place, and he made enough."

347. F.'s Sunday school teacher was telling about Noah entering the ark, and of the animals he took in with him. Suddenly F. burst out laughing. *Teacher.* "F., what are you laughing at?" *F.* "I was thinking,—couldn't he have the jolly circus?"

348. [8. yrs. 3 mos.] One day at the table we were speaking of the death of a friend, and some one said she died the 21st of December. N., who was eating his dinner, looked up rather sorrowfully and said, "She died just in time to lose all her Christmas presents, didn't she?"

349. [8 yrs. 6 mos.] M. has a little brother about two weeks old. She heard her mother speaking about Christmas presents, and after listening a few minutes she said, "Mamma, does Santa Claus know we have baby?" *Mother.* "I guess not." *M.* "Dear me, how can I let him know? It'll make baby feel bad not to get anything."

350. [8 yrs. 8 mos.] S. was eating a peanut, when she said, "Say, are these peanuts made by hand?" I asked her why she thought so. "Well, how could anybody do that?" she asked, and showed me a peanut that had been eaten out probably by a worm. I asked her if she thought somebody had cut the piece out of the nut and put it in the shell again. She replied, "Yes, I thought so."

351. [8 yrs. 10 mos.] The boy had a little dog in his arms, which was whining. *I.* "What is the matter? Is your dog sick?" *Boy.* "Yes; I'm going up to the hospital for Dr. Peabody to cure him." *I.* "Can he cure him?" *Boy.* "Course he can. And he won't charge nothing, either. I saw a man cut his thumb off down at the derrick, and he went up there and the doctor fixed it for nothing."

352. [8 or 9 yrs.] The teacher had been giving a lesson on coral. She told the children that the polyp sucked water into its mouth, and the water had a little lime in it which hardened. This remained after the fleshy part had died away, and formed the coral. Afterwards she asked the children if they knew what coral was used for. One boy raised his hand. The teacher asked him if he knew. He said, "To make lime water."

353. [9 yrs.] She was with her younger brother, who was very pale. *I.* "What makes Frankie so pale?" *Child.* "He makes himself white, he washes himself so often."

354. [9 yrs.] R. said, "When the calves see the snow for the first time, they think it is milk." I asked him how he knew that. He said, "Because they try to lap it."

355. [9 yrs.] His teacher had been telling about savage tribes and the way they live. *W.* "Wouldn't I like to be a Bushman or Caffre?" *I.* "Would you?" *W.* "I'd live in the woods and kill things. I'd have a dog, too, and hunt tigers and kill snakes, and go without my clothes." *I.* "Do you think you would like that better than living here?" *W.* "Yes; I wouldn't go to school there." *I.* "But shouldn't you want to see your folks?" *W.* "No; I shouldn't know them, 'cause I wouldn't ever have been here. I'd have some black folks."

356. [9 yrs.] He was telling me about some prizes his teacher had given for politeness, good behavior, etc. He said, "I know why she gives us those prizes." I asked him why. He said, "Oh, it's because she wants to manage us. She couldn't manage us at all at the beginning of the term, but the other day she gave me a scrap-book for not being kept after school for a month."

357. [9 yrs.] I used to wonder why cats and dogs did not have cats and dogs to doctor them when they were sick. I did not understand the reason for a long time. A cow that I used to call mine broke her horn off. It seemed to me that she ought to have some cow fix it for her instead of Mr. ———.

358. [9 yrs.] My younger brother broke his right arm, and he used to sit in a large chair a good deal of the time that his arm was bandaged. I became so accustomed to seeing him sit there, that whenever I wanted to know which my right arm was, I thought first of him with his right arm bandaged, and then of myself as being in a similar position.

359. [9 yrs.] Miss O. asked the children which they had rather have, one hundred cents, ten dimes, or four quarters. One child said he would rather have four quarters, another that he would perfer ten dimes. Others said they didn't care which they had because they would have a dollar any way. J. said he would rather have one hundred cents. Miss O. asked him why. J. replied, "Well, then if I lost one I would have ninety-nine cents left, but if I had four quarters and lost one I would have only seventy-five cents left." *Miss O.* "Then would you rather have one hundred cents than a one dollar bill for the same reason?" J. said, "Yes'm."

360. [9 and 5 yrs]. B., R. and I had been after pussy willows. When we got home R. said, "Won't you make me a whistle out of the willow?" *Myself.* "Yes." *B.* "Won't you make me one, too? I can't make a good one." *Myself.* "Yes." B. watched me intently for some time, then said, "I shouldn't think you'd make whistles for us." *Myself.* "Why?" *B.* "'Cause you're a teacher. My teacher takes our whistles away from us."

361. [9 yrs. 3 mos.] We had some fish for dinner, and something was said about where we got the fish. When it was stated that the fish was caught in the salt water, F. said he "should think that fishes living in the salt water would be salt fish."

362. [10 yrs.] *He.* "I'm afraid you'll make a cross teacher." *I.* "Why, am I cross?" *He.* "No, but you are so small." *I.* "That won't make me cross." *He.* "Well, all small teachers are cross and fussy. Miss M., my teacher, is awful tall, and she is just as good as can be. She's the best teacher I ever had. All my other teachers were small, little things, and they were so cross I didn't like them."

363. [10 yrs.] At the dinner table this noon, E. was unusually quiet. After some time of deep thought he said, "Mamma, it costs a lot to buy meat and potatoes, and such stuff, don't it?" *I.* "Yes, why do you ask?" *E.* "Well, I was thinking how silly people were to pay so much money for them. I shan't when I'm a man.

When I'm a man I'm going to go out in the woods somewhere and build a log house. It won't cost a cent for anything. I can shoot the birds and catch fish. I could get rich quicker than anything."

364. [10 yrs.] Miss H. had a strange class in Sunday school, in the primary department. At the close F. asked, "Are you a school teacher?" "No, why?" "Because you seem to manage children so well."

365. [10 yrs.] "Which teacher do you like the better?" *Child.* "I think I like Miss A. best, 'cause when the boys are reciting to Miss B. they seem to play with her. They don't do what she tells them." "Don't Miss B. see them play?" *Child.* "I don't know, I guess she don't know how to punish."

366. [10 yrs.] F. went to one of the laundries, not kept by Chinese, the other day with G. B. C., and when he came out said, "Was that man a Chinaman?" "No, why, F.?" "I thought he didn't look like one, but he acted just like 'em; he never said a word."

367. [10 yrs.] M. was telling about the revival meeting last night. She said that Mr. M. asked one of the ministers who Andrew was, and what he did. The minister couldn't tell. Papa laughed and said, "He was a pretty minister, who didn't know who Andrew was." E. said, "Do you know?" Papa said, "Of course." "Well, then," said E., "you ought to be a minister."

368. [About 10 yrs.] W. was reading a history of Greece. *I.* "Why, do you like to read such books as that?" *W.* "Yes, don't you?" *I.* "Yes, I like to read histories pretty well, but I did not know that such little boys as you did." *W.* "Well, you know my father teaches history, so I suppose that's why I like to read it."

369. [10 yrs. 5 mos.] L. had the idea that the reason dogs kept their mouths open was because they were hungry. A dog was in our house last night, and L. kept asking for some food for the dog. I told him that the dog had been fed, but L. said, "He knew he was hungry because he kept his mouth open."

370. [10 yrs. 9 mos.] *M.* "My teacher is awfully rich." *I.* "Is she? What makes you think so?" *M.* "Because she has a green dress, a black satin dress and a seal-skin coat."

371. [10 or 11 yrs.] P. was walking to school with me, and we were talking about marbles. I asked him if he ever played for "keeps," and he said he didn't, as it was gambling. Then I said, "Don't you think it's a good deal more fun to play for keeps?" *P.* "No, I don't play for keeps now, for I'm out of practice and lose all my marbles, and it costs too much to stock up again."

372. [11 yrs.] H. went away on a visit last summer, and was so homesick that his mother had to come to him before he would be contented. He is very anxious to go again this summer, but is afraid he will be homesick. H. said to his sister he was going to the mind cure, to see if he could be cured of homesickness. He has been interested in the mind cure, having been into the office of a mind cure physician once with a man from his father's store, who went there on store business.

373. [11 yrs.] This morning at the breakfast table N. gave the cat a piece of meat. "Now," he said, "I'm going to make the kitten say 'thank you.'" He lifted the cat up by the tail, and said to me, "There, didn't you hear the kittie say 'thank you.'" His mother said, "I wish cats' tails were full of spikes, so you couldn't pull them." *N.* "I wish I was full of spikes, mother, so you couldn't whip me."

374. [8 to 12 yrs.] When I first heard that the earth turns on its axis, I thought the roofs of the houses must be downward at night. I used to try and keep awake, so I could see how it would be. I thought that angels held the bed on the floor, so it wouldn't fall on the ceiling, and that if the bed-clothes were tucked in securely, the people would not fall out of bed. I do not remember of thinking that people would walk with their heads down; all I remember, is about the bed.

375. [12 yrs.] *Mrs. S.* "B., I want some wood." (B. was making a cart in the wood shed.) *B.* "Come out and see my cart." *Mrs. S.* "I can't stop now, and I want some wood right away: my fire is 'most out now." *B.* "Come out and see my cart." *Mrs. S.* "If I come out and see your cart, will you bring me some wood?" *B.* "Come out and see my cart!" Mrs. S. went out, and when she got there, B. said, "Now, you're out here, you can take in your wood yourself."

I do not propose to make any broad generalization from so small a number of records, limited to children of one time and one civilization, and living under similar conditions. No doubt some things are shown to be true, if not of all children of all epochs, nationalities and phases of development, yet of the children of our own time and our own people; and these are the children we are chiefly concerned to know. But I feel as one might have felt in observing the flora of some small district before a science of botany existed, and reporting simply that he had found plants of such and such forms and colors; and as he might have said, "This flower seems attractive to me," or, "I am struck with the way in which this plant grows," so I am inclined to call attention to a few records that especially interest me.

If this be out of keeping with the scientific character of the periodical in which this paper appears, the editor may perhaps justify himself on the ground that the reader has the opportunity to make his own generalizations.

Such records as Nos. 1, 2, 155, 167, 197, 201, 204, 218, 219, 241, 253, 255, 289, 316 impress me anew with the child's lack of understanding.

Of course we know that children have obscure or erroneous ideas of many common things, and of the meaning of many words in ordinary use. But we have not a sufficiently profound sense of the difficulty under which the little human being labors in trying to deal with the overwhelming multitude of objects and events in the midst of which he finds himself to his surprise—sometimes to his consternation—much as the adult sometimes finds himself in dreams. His ideas of time and space, the fundamental forms of thought, are inadequate, not merely as a man's are, from the metaphysical point of view, but as to the practical relations of time and space to the conduct of life. The lack of perspective that appears in

children's drawings exists likewise in their mental representations of the duration, magnitude, importance, character of phenomena. How can the child tell when it is an hour, a day, a week? His own sensations have yet to be modified through experience that enables him to compare his sensations with standards established by nature and by art. He has not yet had enough experience of the coming on of darkness and of dawn, of the succession of meals, of the striking of clocks, the ringing of bells, the Sunday cessation from ordinary work. Play is short, work is long: that is about the sum of his notion of time.

The size of objects, too, he must measure by his own standard, not ours. And what are his puny arm and small wit against the superior, formidable and monstrous beings by which he is surrounded? The world is peopled, for him, with wild beasts and ogres; and this is the reason (is it not?) why the tales of "Little Red Riding Hood" and of giants are so acceptable to him. These stories, which we say are not true, are true to the child's experience of life; they correspond to his instinctive feeling of his position. He walks daily in the midst of dangerous animals and men. And our telling him what is true about things, *i. e.*, what is true for us, does not make it true for him. If we realize this, we shall have more understanding of his lack of understanding, and shall cease to laugh at him for his fears.

On the other hand, such records as Nos. 203, 246, 250, 271, 278, 331, 345, 346, 371, 375, manifest a quickness of apprehension, a penetration, a mother-wit, which surprise us in their turn. Unexpected inferences and applications are made: an acuteness and a reticence are disclosed that are capable of deceiving the child's elders. Feeble and futile as his efforts often are to elude the grasp, or to resist the power of adults, yet now and then he puzzles, confounds and even defeats his powerful adversaries. His success is on a par with that of "Jack, the Giant-Killer;" his beanstalk grows fabulously fast, and it bears his light weight, as he runs up to meet the ogre in his lofty castle, to outwit and to slay him. This experience of the child it is, I suppose, that gives the smack of reality to the seeming nonsense of the tales he loves so well. They mirror for him, not merely his aspirations, but his occasional achievements.

These successes, along with his growing strength of body and mind, as he advances in years, tend to develop that independence of judgment, and that confidence in his own powers, which are shown in such records as Nos. 32, 182, 307, 363. The first of these records reminds one of the talk of Jonson's Capt. Bobadil: "We would challenge twenty of the enemy.

. . Well, we would kill them; challenge twenty more, kill them; twenty more, kill them too: and thus would we kill every man his twenty a day, etc., etc." The record 363, again, makes us think of the rustic clown in Marlowe's "Faustus." Terribly frightened by the devils that Wagner has conjured up, he proceeds, as soon as the creatures have vanished, to inform Wagner—who might be supposed to be acquainted with the nature of the beings he is able to summon into his presence—that, "There was a he-devil and a she-devil: I'll tell you how you shall know them; all he-devils have horns and all she-devils, etc."

The mental states of the "Captain," whose weakness and cowardice are masked by assurance, and of the clown, whose ignorance is prompt to offer itself as knowledge, are the mental states of childhood. Here, too, "The child is father of the man." He is more manly than such a man, since traits that in the child are simply childlike, are childish in the man. Something like this thought may have been in the mind of Björne, when he said, as quoted by Spielhagen, "I was a great man when I was but a little boy."

THE HEARING OF CHILDREN.

By Oscar Chrisman, Fellow in Clark University.

It is my purpose in this paper to bring together what has been done in the way of ascertaining the hearing power of children and the defectiveness of the same. I think that all will admit that in the present mode of teaching, the ear plays the most important part. It is claimed also by some that even the very young child receives more of his training through hearing than through any other sense. If the hearing is of so great importance, then, how necessary it is that this sense and its organ should be carefully studied, for defects here will have very great influence upon the mental unfolding of the child. That this faculty has been neglected needs no proving. Not only do the parent and the teacher show indifference and ignorance in this matter, but even the physician has made very little study of this organ and its function. Even the otologist has done but little more in the study of the hearing of children, for, with few exceptions, the otologist has simply studied the cases which have come under his notice. No doubt he has become fully satisfied that there is much defective hearing among children which might be greatly aided and could be prevented, yet he has not gone into the home and the school-room and made a study of such. It may be that many have wished to study the hearing of school children, but proper encouragement and authority were not accorded by the teachers and officials, but it is pretty certain that no attempts have been made further than are recorded in this paper, and the reader will note that only one party[1] states that proper encouragement was not given.

It is very likely that the great difficulty in determining the extent of the deficiency of hearing may stand in the way of knowing of its occurrence. It is hard even for experts to determine defective hearing in infants, and so it is, of course, much more difficult for the parent to know of it and to determine its extent. Very often the child himself is not aware of any deficiency of hearing, and even an adult person may be quite hard of hearing and not at all be aware of it. For, in this sense of hearing there is, as in the other senses, much more capacity than is needed for ordinary occasions, and as the hearing grows deficient this latent power is brought out, hence the party may have much deficiency and not know of it or even have the least hint in that direction.

Not only does the child not know of his defect, but his parents and teachers are not aware of it, and even the family physician will many, many times pass it by. No doubt this is caused by the fact that the child appears to hear readily enough on ordinary occasions—produced, in fact, by his bringing into play the latent power of his

[1] Dr. Sexton in the white public schools of New York city in 1881.

organ of hearing,—and his failure to comply with requests or commands of parent or teacher is accounted to his inattention, disobedience, and even stupidity. What makes this seem to be all the more true to the parent or the teacher, is that nearly all defective hearing children hear better at some times than at others; this is especially true of those suffering from catarrhal troubles or from adenoid vegetations. Also, one ear may be fairly able to hear well while the other ear is quite defective, so that when the good ear is turned towards the speaker, the child hears quite well, but if in a very short time—when his other ear is towards the speaker—he is slow in obeying or not at all, then this seems to prove disobedience or inattention. Further, from the forced attention that the defective hearing child must bestow, and by the straining of his latent powers of hearing, he is unable to withdraw from the object of his attention and fasten upon something new as quickly as can the good hearing child, hence he is often counted dull because his whole countenance and his very actions express such.

The saddest thing in all this is that in many cases the hearing power of the *young* child is not sufficiently tested, and quite often a child who is pronounced wholly deaf, or at least very hard of hearing, could gain a fair degree of hearing and often completely recover his hearing faculty by proper medical treatment and careful training, whereas through ignorance and carelessness, and even downright stupidity of the parent, the child is doomed to a life most miserable.

From the examinations given here and the stated results, it is clearly shown that the hearing must be carefully looked after and frequently tested, and that parents and teachers should be very, very patient with the dull, stupid, disobedient child, and very painstaking in looking after his welfare.

The Hearing of Young Children.

Following are some of the tests made upon the hearing of young children. All[1] the work that has been done is not given, as it is the wish to give here only a sufficient amount to show the development of this sense and the importance of its care in the young.

Darwin.[2]—During the first fortnight Darwin's child often started on hearing any sudden sound, and blinked his eyes. At 66 days Darwin happened to sneeze, upon which the child started violently, frowned, looked frightened, and cried rather loudly; for an hour afterward the child was in a nervous state, every slight noise making him start. Before and after this he started at sudden sounds. When 114 days old Darwin shook a box containing comfits very near to the child's face, at which he started; when shaken empty, though even nearer, it had no effect. Not even when he was 124 days old was he able to recognize from whence a sound came. Before he was four and a half months old, his father had been accustomed to make close to the child many strange and loud noises, which were all taken as excellent jokes, but at this period one day Darwin made a loud snorting noise, which he had never

[1] Miss Millicent W. Shinn, Niles, Cal., editor of the *Overland Monthly*, has made a very close study of a child along the lines studied by Preyer, but her results on hearing are not yet published. See "Notes on the Development of a Child," Millicent Washburn Shinn, University of California Studies, Berkeley, 1893.

[2] Quotation marks will not be found occurring very much in any of the work here, because as far as possible the exact language of the author is given, and this has been done in so many places that quotation marks would only be troublesome, so this statement is made in order to do away with them.

done before; the child instantly looked grave and then burst out crying. Two or three days after, the same noise brought the same result.

Perez.—We know that new-born babies are deaf, the external auditory passage being closed and the cavity of the tympanum containing too little air. But we are ignorant as to whether they arrive at the faculty of hearing by intermediate degrees, or if by a sudden bound their auditory apparatus becomes all at once sufficiently developed to fulfill its functions. It is easy, however, to observe during the first fortnight a very great susceptibility to the slightest sound of any kind. A baby shudders and blinks its eyes when it hears any sudden noise,—a door being closed, a piece of furniture moved, the rolling of a carriage, a sneeze, a burst of laughter, a scream, or a loud song.

Infants are very early excited by sound, by musical instruments, or song. Tiedemann's son heard the piano first at forty days, and he showed singular delight and excitement. A young child delighted in hearing singing or playing at one month of age; at six months he visited his young aunts, and he was delighted with his younger aunt's singing, but much more so with the older aunt's more melodious voice. All children are not equally sensitive to melody, but all clear, ringing sounds, especially if reiterated more or less rhythmically, seem to amuse. Perez says that he has seen many infants of two months whom noises of medium intensity—shutting of door, footstep, voice, bark of dog close by—did not seem to affect in any way. At four or six months almost all babies like being sung to.

At fifteen months the ear is now always promptly turned towards the point whence a sound is heard to come; it can also hear more sounds, and has even the power of choosing what it will listen to, and of shutting itself against sounds which are displeasing to it; it has further learned to distinguish many creatures and objects by the different sounds they produce.

There are sounds which are pleasant and sounds which are unpleasant to children, according as their vibrations correspond to certain inherent states of their personality, or awaken concordant emotions in the mysterious recesses of their hereditary sensorium.

Children soon become accustomed to noises disagreeable at first. Startling, piercing, scraping noises are not so disagreeable to them as to grown people. Few sounds displease them on moral grounds, or by the reason of the association of ideas which makes noises call up the ideas of objects known to be disagreeable. Like bees, serpents, monkeys, and other animals, the most rude and deafening noise, providing it is rhythmical, is as good as music. At the very earliest that children can produce sounds by pounding, etc., they are evidently as happy as they can be, in the execution of these feats. Perez can never see little children doing their best to deafen themselves and others without being reminded of the monkey musicians of Africa. "Sounds are produced by monkeys with as determined an intent as that of a bell-ringer or player on a drum. Black chimpanzees of Africa shriek and beat and thump on dead-wood with sticks, hands, and feet."

Preyer.—It is not easy to determine accurately just when the infant first experiences sound. No doubt its hearing is increased by exercise and that an occasional temporary dullness occurs.

Kussmaul's loudest discordant noises during the first days of the infant produced no reaction. Feldbaresch's clapping of hands caused sleeping children more than three days old to start.

Champneys' child did not react before the fourth week upon any noise however loud, not even clapping of hands, if no vibration of room or bed occurred.

Geuzmer was the first to make experiments by measuring. He ascertained the greatest distance at which infants' eyelids quivered at the striking of a little bell. It appeared that almost all children of one day or certainly of two days, reacted upon impressions of sound, but at first unequal. The average distance at which the striking of the bell was heard was found to be eight to ten inches, but the figures varied from one to twenty. In one case, that of a very active child, the distance the first day was 8 inches, on the sixth 18, and on the twenty-fourth 24; with a phlegmatic child, on the first day irregular, on the eighth day 5, on the twenty-fourth 11. It may be seen from these figures how unequal the progress is, but this whole series of experiments, limited to about thirty observations, on fifteen children, is uncertain.

Dr. Moldenhauer's tests were better, yet doubtful. He used the French toy, *cri-cri*, which gives a loud, brief, disagreeable sound, with discordant high overtones; and continues almost identical after many experiments, and can be made quite close to the ear without involving other stimulus. With very few exceptions children distinctly reacted at once upon the sound stimulus at the first trial. Fifty children were tested and all reacted. Ten were less than 12 hours old, seven from 12 to 24 hours, all the rest older. The least degree of reaction was indicated by a distinct quiver of the eyelids, even without interruption of sleep; a stronger degr e of reaction by wrinkling of the forehead; then came head movements, mostly single short twistings of the head; finally starting, accompanied by violent quivering of the head, the arms, and the upper part of the body; sleeping children awoke and screamed. Reflexes occurred more plainly and quickly after end of the second day. In experiments following one another in quick succession, dullness is shown, going as far as entire absence of reaction. Children sleeping soundly or nursing reacted less distinctly than when awake or half asleep.

All children tested by Moldenhauer were six hours old or older. Four of the fifty were deaf even after 24 hours, three did react in later repeated experiments in the same hour or on the following day. A child of three days did not react even at the second trial.

Preyer saw a strong child of 10 hours not react at all upon the *cri-cri*, and one of six days very slightly.

When Geuzmer softly struck his bell very near the ear of children that heard well (probably more than two days old), sometimes they turned their heads to that side, if nursing they stopped. Very violent striking of the bell made them restless.

If a small tuning-fork, in vibration, warmed and carefully placed on the head, produces no other reaction than that of fork not in vibration, it may be inferred that the inner ear has some share in the deafness of the newly-born. But such experiments must be made on many individuals. Moldenhauer got no definite results with tuning-forks on account of the sensitiveness of the skin of the head.

By ever so loud a noise—clapping of hands close to the ear, whistling, very loud screaming—infants are not within the first half-hour, according to Preyer's experiments, brought to screaming from a state of quiet nor quieted if screaming.

Preyer saw his child in the twenty-first hour of life move both arms symmetrically at a loud call, but he says perhaps it was caused

by being breathed upon; for clapping of hands, whistling, speaking, produced no result, and on the second and third days no reaction upon sound-stimulus could be induced. Not until the first half of the fourth day was he convinced that the child was no longer deaf. Hand-clapping or whistling close to him then produced sudden opening of the half-shut eyes, as the child lay warm and comfortable. This occurred several times on the fourth day. Also for the first time, on the fourth day, several times the child when crying stopped as soon as Preyer began to whistle close to him. On the eleventh and twelfth days, it was noticed that the child became quiet always at the sound of its father's voice, which seemed also to call forth a sort of intense expression of countenance, that, however, cannot be described. On the twenty-fifth day pulsation of lids often followed when Preyer spoke to the child in a low voice, standing before and near him. On the following day he started suddenly when a dish was noisily covered which was near him, but which he could not see. On the thirtieth day fright was still more manifested; standing before the child as he lay quiet, Preyer, being called, said aloud, "Ja!" (yes); directly the child threw both arms up quickly, made a convulsive start with the upper part of the body, while at the same time his expression, from one of contentment, became more serious. The same scene was enacted at another time in the day on the slamming of a door.

In the fifth week, sensibility of sound had increased to such a degree that the child seldom slept in day-time if any one walked about or spoke in the room; whereas, so late as the seventh day, a loud call did not awake the sleeping child. Increased sensibility to sound is also proved by quick turning of head when anyone sits on the child's bed without being seen by him, and also by the starting at moderately loud noises.

In the sixth week the child started at quite insignificant noises even when asleep and did not awake. About this time he could be quieted from screaming at once by his mother's singing. The first time so quieted the child opened his eyes wide, evidently astonished at the new sound. On the following day he gazed at his mother, while she was singing, with wide open eyes; probably he associated the tones with the oval face.

In the seventh week fright at low sounds was greater than before. One day, while sleeping, some dishes fell to the floor, which caused him to throw both arms up swiftly with fingers outstretched, and remained so for more than *two* minutes, without the child's waking. Now he showed great satisfaction at his mother's voice. When crying from hunger, a low sing-song causes a pause and attracts attention. Speaking does not invariably effect this.

In the eighth week the child heard the piano for the first time. He showed satisfaction by an unusual straining of the eyes and lively movements of arms and legs at every *forte*, as well as by smiles and laughter. Higher and softer tones made no such an impression. Same in following months. Preyer concludes that more than a year before the first imperfect attempt at speech is made, the child discriminates between (musical) sounds and noise. A child of two or three months of age often utters sounds of satisfaction when it hears music.

In ninth week a watch (repeating), to which he had paid no attention before, now arouses his attention to the highest pitch. At this time also, although the child could not with certainty turn his head towards sounds, yet he could follow the moving hand correctly.

In the eleventh week Preyer noticed that the child beyond doubt moved his head in the direction of sounds; this was not noticed by other investigators before the second quarter of the first year—some did notice it a little earlier. Preyer at this time knocked on a mirror, being behind the child, and immediately he turned his head toward the sound.

In the twelfth week, the turning of the head towards sounds was sudden, even when the look did not take at once the right direction. When the direction was found the child would hearken evidently with close attention.

In the sixteenth week the turning of the head towards sounds takes place with certainty of reflex action. Before this no notice at all was taken of distant sound stimulus.

The crumpling of paper, which was the first noise artificially produced by the child himself, gave pleasure and was frequently repeated. (Especially so in the nineteenth week.) In the twenty-first week, at beating of gong, for photograph, he became motionless and stared with fixed gaze at the metallic plate. Hearing became so acute in the fifteenth week that when the child was taking milk, he would break away from it and turn to not too slight a noise made near him.

After a half-year the babe often gazed steadily for minutes at a time on Preyer's face, with expressions of wonder, with eyes and mouth wide open, when he sang single notes to him. He utters joyous cries now at military music.

In the eighth month there is a quick closing of lids, a single wink mostly, at every loud, sudden sound, and at every new one. He shows both fright and astonishment now.

In the ninth month the child slammed down the cover of a large "caroffee" more than a dozen times in succession, with winking eyes, starting of whole body, and countenance expressing great attention. The child now turns his head every time he hears his father's voice and at every new noise. During teething, the sensibility to acoustic stimulus is, moreover, noticeably increased. A loud word then produces winking, fright, quicker breathing, screaming, and tears.

In the eleventh and twelfth months the screaming child generally allows itself to be quieted by a decided "sh!" but not by any other spoken utterance, but by any singing, even false notes. On the 319th day occurred a remarkable acoustic experience, which gives evidence of great intellectual advance.—The child struck a plate with a spoon, then he accidentally touched the plate with his hand; he noticed the dulled effect. Then he did the same with hands changed, thus proving that the dulling was in the plate. So the child proved or interpreted his sound impressions, yet did not know a single sound.

In the twelfth month he was accustomed to hear the stove in room A filled every morning. On his 363rd day, he heard such in room B, next room. The child looked in the direction of the sound, but discerning nothing he turned his head around nearly 180 degrees and regarded the stove in room A with an inquiring gaze. (It had been already filled.) This shows logical activity applied to perceptions of sound, and this before the ability to speak.

Such experiments as are recorded after this are entirely those of the child's own doing. In his thirtieth month, while eating he held his hand by chance to his ear while a kettle of water near him was boiling. He noticed the diminution of sound, then he repeated this several times, till no longer wonderful. After the end of his first

year he strikes on the piano and then turns around to see if anyone is noticing him. He listened to the ticking of a watch in 16th, 17th, and 24th months, sometimes holding it behind the auricle and sometimes on his cheek. In the 19th month, when the watch was held above on his head, he heard the ticking. The conduction of sound by the bones must have been already established for some time past.

Movements were not performed in time till the end of the second year. He danced in his 21st month, but in his own fashion, not rhythmically. It was found absolutely impossible, notwithstanding much pains, to teach the child to name rightly even the three notes C, D, E (end of third year), though his hearing for noises and vocal sounds was in general acute.

A little girl in her ninth month could sing correctly every note given her from the piano, and seemed to find discords unpleasant; she wept at the blowing of a small tin trumpet. This child and two others of the same family could sing before talking, and correctly sing airs sung to them. Such a child sung itself to sleep in the eighth month, and in its nineteenth month accompanied songs and pieces sung and played by others by clapping its hands in correct time. (Frau Dr. Friedemann.)

Another little girl in her eleventh month takes pleasure in hearing music, likes to strike on keys of piano, and when one begins to sing airs often sung to her, she springs and accompanies the singing with movements of her body, and turns her hands this way and that. (Fr. v. Strümpell.)

The Hearing of School Children.

As will be seen, this work is arranged under the countries where done and the parties doing the work. It is very probable that all the investigations that have been made upon the hearing of school children in this country and in Europe are given here, as I have found no reference to any other investigator in the bibliography following, nor in many other medical and pedagogical journals examined for such. Although not numerous and frequent tests have been made, yet enough has been done to show the great need for the examination and care of the hearing of school children.

America.

Sexton.—Dr. Sexton examined the hearing of 570 children in the schools in New York city: 261 were from the colored public schools, 6 to 15 years of age; 226 from the Roman Catholic parochial schools, 8 to 13; 83 from the white public schools, 10 to 15. He did not receive proper encouragement in the white public schools, which accounts for the small number examined.

Sexton's method was about as follows: (1) The tests were made by the teachers in their own rooms. (2) Sentences were given for the child to write out. (3) The pupil was seated 12 feet away from the teacher, with his eyes closed. (4) An assistant stopped one of the child's ears with his finger in case the other ear was to be tested. (5) The examiner by raising and lowering his voice determined the acuteness of hearing. From Sexton's tables, I have been able to make out the following table:

SUMMARY OF DEFECTIVE HEARING PUPILS.

Whole Number Tested.	SCHOOL.	CONDITION OF EARS.								To. No. of Ears Afflicted.	Number of Pupils Afflicted.			To. No. of Pupils Afflicted
		Heard the ordinary voice at 12 ft.		Heard loud voice at 12 ft.		Heard shouted voice only at 12 ft.		Deaf.						
		Right.	Left.	Right.	Left.	Right.	Left.	Right.	Left.		Right.	Left.	Both.	
261	Colored Public.	8	11	13	13	4	1			31	11	8	6	25
226	Roman Catholic.	8	15	26	15	2	6			49	14	9	13	36
83	White Public.	5	9	8	3	1	3	1		10	10	5		15
570	Totals.	21	35	47	31	7	10	1		96	35	22	19	76

So there were 56 ears of the deficient hearing pupils that could hear the ordinary voice; 78 ears that could hear the loud voice; 17 ears that could hear the shouted voice only; and one ear totally deaf. Or, 76 pupils defective in one or both ears—about 13 per cent. of all the pupils examined. Of all this 76, only one was known by the teacher to be hard of hearing; this was a colored boy, who heard only the loudest voice in the right ear, and loud voice in the left ear. The teacher said that he was a little deaf, and being a mischievous boy he was required to occupy a back seat. Only three of the 25 colored pupils were aware that they were deaf, five of the 36 Catholic, and two of the 15 white. One of the boys in the white public school who was found to be deaf had always been regarded as a dull pupil. His seat was the fourth from the front.

Dr. Sexton states that among 450 cases of children's deafness, selected for observation from children seen in private or infirmary practice, 371 were attempting to retain their positions in hearing schools, while 79 were either so deaf as to be excluded or were not of school age.

Worrell.[1]—At Terre Haute, Ind., Worrell examined 100 children of St. Ann's Orphan Asylum and 391 children of a school situated in a

[1] Deafness Among School Children. J. P. Worrell, M. D., Trans. Ind. State Med. Soc., 1883. In no place except the above has the name *Worrell* occurred, but his work has been given under names as follows:

Norrell.—Review of Zhermunski, Zeit. f. Schul., 1889, p. 105.
Review in Archiv. of Otol., 1884, p. 200.
Schmiegelow in Zeit. f. Schul., 1889, p. 443.
Lunin in Vrach, 1888, p. 806
Bezold in Zeit. f. Ohren., 1885, p. 184.
Norell.—Zhermunski in Vrach, 1888, p. 741.
Norrel.—Review in Arch. of Otol., 1884, p. 206.
Morrell.—Furst's translation of Bezold, Arch. of Otol., 1885, p. 158.
Worsell.—Review in Arch. of Otol., 1883, p. 344.

quiet, healthy neighborhood, among a prosperous people, affording children that, in regard to health and hygienic surroundings, are quite up to the average. There were ten departments in the school, and the children ranged from 6 to 15 years of age.

In making the tests, whispering is used, modulating it according to the size of the room, determining the necessary force by the ear of the teacher, who is placed at the position afterward to be occupied by the children under examination. The child is then placed at the side of the teacher in the corner opposite the examiner, with one ear covered by the hand while the other is being tested. The child then repeats the simple words or sentences uttered by the examiner. If the child does not repeat these correctly the examiner advances until the words are heard and repeated by the child.

The rooms in which the children were examined gave a distance of 37 feet between examiner and child. Those were marked with impaired hearing when the examiner found it necessary to step forward to a greater or less distance in order to be heard.

The tests showed the following:

SCHOOL.	Number of Pupils Tested.	No. having both ears impaired.	No. having one ear impaired.	To. No. with impaired hearing.
St. Ann's Orphan Asylum	100	16	11	27
The other school.	391	56	42	98
Totals.	491	72	53	125

In this second school, among 391 pupils, Worrell found 19 pupils who could not hear above 15 feet; one heard at 3 feet in each ear; one 3 feet in one ear and 5 feet in the other; and one that heard at 4 feet in one ear and one foot in the other. This last one was the only one known to the teachers as having any impairment of hearing at all, and this was known through his just having had scarlet fever. So with 98 defective hearing ones in this school, only one was known to the teachers. Of 27 cases of impaired hearing in the orphan asylum, but two were known to the teachers.

The average age of all the pupils in each grade was found, and the respective ages of those with high degree of impairment of hearing, and it was found that the defective hearing ones were for the most part the oldest ones of each grade, also generally the largest in size, and they usually occupied the back part of the room.[1]

GREAT BRITAIN.

Barr.—Dr. Barr examined the hearing of 600 school children who were attending board schools in Glasgow. They were from 7 to 14 years of age, one-half being boys and one-half girls. Barr's results

[1] Although the following is not a test of school children, yet the results show so well how little is known of the capacity of hearing that it is well to give it here. In New York city, probably during 1892, at a large eye and ear hospital, Dr. Fanning made the following experiment: Without previous warning twenty-five patients were selected, care being taken to have none but those who had never suffered from any, even temporary, defects of hearing. He tested them then for acuteness of hearing and found that of the twenty-five not more than five could be said to enjoy perfect hearing. See "Deafness, and the Care of the Ears," Abram Mills Fanning, M. D., *Pop. Sci. Month.*, Dec. 1892, p. 211.

are given in regard to whispering and ticking of watch (method not given). The following show his results:

I. Range of Hearing of the Defective.

Children Affected in	Speech (whispering) heard at a distance of less than 2 yards and the watch at less than 7 inches.	Speech (whispering) heard imperfectly at 6 yards from the ear, and the watch at less than 21 inches.	Speech (whispering) heard imperfectly at 6 yards from the ear, and the watch at distances varying from 21 inches to 38 inches.	Total number hard of hearing.
Both ears.	23	20	15	58
One, or mainly one.	16	54	38	108
Totals.	39	74	53	166

II. Range of Hearing of Bright and of Backward Pupils Compared.

Condition of Children.	Whispering heard at a distance of less than 2 yards, and the watch at less than 7 inches, with		Whispering heard imperfectly at 6 yds., and the watch at less than 21 inches, with		Whispering heard imperfectly at 6 yds., and the watch at distances varying from 21 to 38 inches, with		Total.
	Both Ears.	One Ear.	Both Ears.	One Ear.	Both Ears.	One Ear.	
Bright.	4			3		7	14
Backward.	6	2	2	12	2	4	28
Totals.	10	2	2	15	2	11	42

In Table I. is shown that Barr found 166 pupils of the 600 to be deficient in hearing, or 27.66 per cent. After his tests were made Barr asked the teachers to select 70 bright pupils and 70 dull ones; this being done, he showed the condition of the hearing of the two divisions, as is found in Table II. From this table it is seen that there are twice as many with defective hearing among the backward children as among the bright children.[1]

[1] Although Dr. Francis Warner, physician to the London Hospital, examined 50,000 school children for various troubles, yet "tests for hearing were not generally used, but when a child was found deaf, it was noted." He gives: Deaf or partially deaf, 67 children, of whom 34 are boys and 33 girls.
See: The Medical Press and Circular, 1891, p. 277.
The British Medical Journal, 1889, Vol. II. pp. 187 and 1,272.

FRANCE.

Moure.—Moure's investigations were made upon the school children of Bordeaux at two different times—the first in 1881 and the second in 1883, perhaps. In the first series of examinations 1,768 pupils of both sexes were examined, among whom were found 312, or 17.6 per cent., with defective hearing. In the second series there were 1,820 pupils examined, of whom 304, or 16.6 per cent., had impaired hearing. Thus out of a total of 3,588 children of both sexes, of whom 1,972 were from 5 to 10 years of age and 1,616 from 10 to 14, were found 616 having defective hearing, divided as follows:

1.	Children hearing the whisper only at 1 meter or less	76
2.	Children hearing the whisper from 1 to 2 meters	159
3.	Children hearing the whisper from 2 to 3 meters	381
	Total,	616

Moure states that a child whose hearing is normal should hear whispering at least at 15 meters in absolute silence, and thinks when he put as the number of defective hearing only those children who heard whispering not above 5 meters, that it is truly below the truth, and is certainly not an exaggeration.

It is claimed by Moure that at least 500 of these 616 children could be cured if properly treated, but if left to themselves at adult age all will be more or less deaf. He calls attention to the fact that perhaps deafness is the most frequent cause for exemption from military service, and so some insignificant, simple injury in childhood may chance to cause the native country to be deprived of numbers of defenders.

Gellé.—Gellé examined the hearing of children in an orphan asylum, from 7 to 14 years of age. He found 20 to 25 per cent. of the whole possessed with deficient hearing. In most cases these hard-hearing children were pointed out by their teachers as lazy, absent-minded, and remaining behind their fellow-pupils.

His method of testing is this: A table is set at one end of the room and from this, along the floor, a chalk mark is drawn, marked off into meters; the pupil is placed at the table with his back towards the dictator, who stands at the other end of the room and changes his distance along the marked line to suit the pupil's hearing. Only very simple and intelligent sentences are dictated, with low voice. It appears as if 8 meters was taken as the average distance for the normal hearing of whispering.

Intelligent, unintimidated pupils control naturally what they write and quickly erase the mistakes of hearing, but they become thereunto only the clearer. During the dictation one is surprised at the number of children of each age who make mistakes in hearing at various distances (3.5 to 8 meters). One child wrote at 7 meters "nos plaies" instead of "l'eau coulait;" an intelligent little girl wrote at 7 meters "phanton" instead of "canton," but wrote correctly at 5 meters, etc., etc. The errors decreased, respectively stopped, with the diminishing of the distance.[1]

Gellé also examined with the watch the hearing of pupils in schools of the first order in Paris. He carefully tested those who were lowest in their classes, and were counted dull and bad, and always being punished and scolded. He counted the normal distance for hearing the watch at 1.25 meters. In one school,

[1] I received too late for aid upon this article this most excellent paper: Sur les conditions de l'audition dans l'école. M. le Dr. Gellé. Ann. d'hyg. publ., 3e sér. T. IX. 1883, p. 47.

among 7 primary pupils he found only 2 who could hear the watch at more than a meter with both ears, 4 heard it with both ears at 60 centimeters and under, and 1 heard it with one ear at 1 meter and with the other ear at 20 centimeters. Among 13 intermediate pupils, 2 heard the watch at more than 1.25 meters; 5 at from 1 to 1.25 meters on one side and at 60 centimeters and below on the other; 6 at 65 centimeters and below in both ears. This testing was done in the greatest silence. Good cranial perception was noticed in all. All these pupils were noted by their teachers as incapable, unintelligent, disobedient, were frequently punished, and almost always placed last (on the row of seats) for their disobedience.

In another school 20 pupils, 10 to 18 years of age, the lowest in their classes, heard the watch as follows: 4 heard it on both sides at more than 1.25 meters; 6 at 1 meter on one side and 60 centimeters or less on the other side; 10 on both sides at 60, 50, 45, 30, and 12 centimeters. Thus 16 of the 20 showed decided defectiveness in one or both ears.

Among 20 of the foremost pupils in four classes in a school, there were but 6 who heard the watch at less than 50 centimeters, whereas among 20 of the lowest pupils in these same classes, there was not a one that heard the watch at more than 50 centimeters. Among 20 foremost pupils of another school, 3 only heard below 50 centimeters; but 20 of the lowest pupils of the same school had 17 among them who heard only at 50 centimeters or less.

Sixty-one girls and boys placed on the rear seats in the various rooms showed the following: 14 heard the watch on both sides at 1 meter or more; 16 on one side at 1 meter, and on the other at an average of 56 centimeters; and 31 at an average of 44 centimeters on both sides. The 13 foremost pupils of this group heard thus: 2 on both sides at 1 meter; 2 at 1 meter on one side and 80 centimeters on the other; 9 heard at an average of 70 centimeters on both sides. Thus the lowest hearing group among the foremost pupils gave an average reach of hearing of 70 centimeters, while the lowest hearing group of the whole gave an average of but 44 centimeters.

In a communal school of boys, 5 best of 4 classes heard the watch on an average of 77 centimeters and the 5 poorest on an average at 54 centimeters. In the 20 foremost of this school, 5 heard on one side at 1 meter or more and on the other from 1 meter to 80 centimeters, and 15 heard on both sides at an average of 70 centimeters. In the 20 lowest, 2 heard at 1 meter or more on both sides, and 18 heard on both sides at an average of 47 centimeters.

In a school of girls the average of the auditory range of the foremost and of the lowest showed a constant difference in favor of the foremost. But when a class was reached in which the pupils were about equally industrious and intelligent, this difference ceased to be sensible.

Attention is called to the fact that a child may not hear well at all at a certain distance, but quite well at a closer one. A girl who did not know what to write when at 7 meters distant, wrote wrongly at 5 meters, but wrote quite correctly at 4 meters. The range of hearing of the boys was found to be greater than that of the girls.

In general, Gellé finds about 25 per cent. of defective hearing among school children. Among those whose reach of hearing on one or both sides does not extend to 1 meter, there are found less than two-thirds of the foremost pupils and more than three-fourths of the lowest pupils; and among these so defective the average reach of hearing is always much higher in the best pupils than in the poorest.

GERMANY.

Weil.—Weil examined the hearing of 5,905 children, 3,228 boys and 2,677 girls, of Stuttgart. The experiments were made in one public school, three common schools, two intermediate schools, a college, one higher school for girls, and one elementary school; in three large institutes, viz., orphan asylum, blind asylum, and a protectory. The common schools were attended chiefly by the children of the poorer classes, working people, etc.; the intermediate schools by children of artisans; and the higher schools by children of the better classes of society, the same being the case in the primary school. These particular schools were chosen because boys and girls of all classes of society could be examined.

All examinations were made as follows: The children were brought into a room set apart for the purpose, four or six at a time, during school hours. The name and age were taken and also their height. They were asked whether they had had scarlet fever, diphtheria, earache, noises in the ear, suppuration, and the like; then the ears were examined by sunlight with a plane mirror. Next the distance at which they heard whispering was noted—each ear separate. Each child was placed at a distance and required to repeat what Weil said. Weil gave up the examination with the watch, since he soon saw it was too uncertain; nor could he use Politzer's acoumeter, because it required too much space, being heard by good ears at 25 meters, while the rooms used varied from 7 to 25 meters in length.

Different sentences were spoken to each child in order to obtain all possible exactness, but as sometimes there were more noises in the vicinity than at others, the figures are not as exact as desired. In those cases in which there was difficulty of hearing, the examination was more extensive. In every case where there was doubt, it was recorded *in meliorem partem*.

In quiet localities the whisper was heard at 20 to 25 meters, but there were a great many who could not hear at this distance, yet, at the same time, the condition of their ears did not put them to any inconvenience. So Weil recorded those children who heard at less than 15 meters as hearing badly, as this seemed to be the normal hearing distance. He found about 30 per cent. who were deficient of hearing ranging as in the following table :

RANGE OF HEARING THE WHISPER.

PUPILS HEARING IN	METERS.												TOTAL.
	Less than 20	18	15	14	12	11	10	9	8	7	5	2	
One ear.	164	192	140	11	97	14	92	21	63	111	100	60	1065
Both ears.	783	642	325	112	222	40	203	136	76	315	133	49	3036
Totals.	947	834	465	123	319	54	295	157	139	426	233	109	4101

Weil finds that the results show better hearing powers in those schools frequented by the better classes than those attended by the poorer classes ; that the younger children hear better than the older ; and that the frequency of defect of hearing increases with the age of the children.

Unfortunately some ear affections escape observation, and especially when they are not well pronounced. The sufferers are often misjudged and considered inattentive, and so treated, while they are simply hard of hearing. So thoroughly is Weil convinced of this that he has always insisted that every *inattentive child should have his ears examined.*

He further states that he believes that the great majority of these children whom he examined and found defective could be much benefited, and many of them entirely relieved in a few minutes.

Bezold.—Bezold examined, in Munich, the alumni of the Ludwigs-gymnasium—the so-called Holland's Institute and two public schools—the former common school II. A and the Protestant school II.; 1918 children in all were examined.

The testing at Holland's Institute was made in the dormitory, 15 meters long (including recesses of the door, 16 meters) and 8 meters broad. Examinations were usually made in the afternoon after four o'clock, and the quiet was as perfect as could be obtained during the day, as the boys were then away to their lessons. This room was remote from the street.

In testing with the whispered voice and Politzer's acoumeter, the pupil to be examined stood at one end of the dormitory, turning the ear to be tested toward Bezold and closing the other tightly with his finger, and covered his eyes. Bezold moved along a line on the floor, marked off in meters, towards the pupil. The words used in testing with whispered speech were exclusively the numbers 1–99. Besides the number 100, which in proportion to all the other numbers is heard at too small a distance, 7 (sieben), 5 (fünf), 9 (neun), were understood with the greatest difficulty. When "neun" at the beginning of a double number and all the other numbers, except "hundert," were correctly repeated after several tests, this point was taken as the limit for hearing whispered speech. This was verified by "hundert."

With the smaller children of 6–7 years in the public schools, the tests were continued a pretty long time. In testing with whispered speech, Bezold took special care, as he based all his results upon such tests. He found that a large number perceiving speech at an equal distance hear not only the watch, but also Politzer's acoumeter at greatly varying distances.[1]

Bezold's experiments gave the following results :

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[1] The following was noticed in one day's testings by Bezold: "On a sunny day, when through the numerous windows a row of sunbeams fell across my field of examinations, the results of the tests appeared to me remarkably poor, and this perhaps might be explained by a partial reflection of the sound waves by the variously warmed layers of air lying between me and the person examined. Thenceforward the shades were always closed on a sunny day."

RANGE OF HEARING WHISPERED SPEECH.

	Above 16 meters on both sides.	16-8 METERS.		Total pupils hearing on both sides above 8 meters.	8-4 METERS.		4-0 METERS.		Total pupils hearing on one and both sides below 8 meters.	Total number of pupils tested.
		On one side (other side above 16 meters).	On both sides.		On one side (other side above 8 meters).	On both sides.	On one side (other side above 4 meters).	On both sides.		
Boys.	396	130	181	707	78	50	52	47	227	934
Girls.	341	151	224	716	72	78	69	49	268	984
Total.	737	281	405	1423	150	128	121	96	495	1918
Percentage of boys.	42.4	13.9	19.4	75.7	8.4	5.4	5.6	5.0	24.3	100
Percentage of girls.	34.9	15.3	22.8	72.8	7.3	7.9	7.0	5.0	27.2	100
Total percentage.				74.2					25.8	

From the preceding table is obtained 25.8 per cent., or nearly 26 per cent., possessing one-third or less of the normal hearing distance. 14.5 per cent. of the whole—of which 7.8 per cent. unilaterally and 6.7 per cent. bilaterally—perceived whispered speech, heard by the normal ear at 20-25 meters, only at 8-4 meters; and 11.3 per cent. of the whole—6.3 per cent. unilaterally and 5.0 per cent. bilaterally—heard the whisper only between 4-0 meters.

Of the children found in the schools with ear disease, according to the state of the drum-head disclosed, 41.7 per cent. offered a certain prospect of more or less complete cure if subjected to appropriate treatment.

Among the 1289 pupils of the common school, there had been found 296 who either on one or both sides heard whispered speech only at 8 meters or less; among these were 60 pupils who heard it on both sides at 4 meters and less, and finally, 33 who heard it on both sides at 2 meters and less. Now every single pupil was calculated separately in the following manner: Of each of the last mentioned groups of hearing power, all the rates of progress were added, and from the sum was calculated the mean average place belonging to the single group of pupils with defective hearing. This average place was compared with the average place of the total number of pupils in the class in question, which is simply expressed by halving the number. In order to make all the

classes comparable with each other, it was necessary, too, to render the number of class pupils equal to each other, which was taken at 100, so that the mean average place for the whole school is expressed by the number 50. With reference to this number, the average places were calculated which belonged to the above three groups with defective hearing.

In this way Bezold obtained the following results of the rate of progression for the three groups with diminished hearing. The average rate of progress was :

Among those hearing on one or both sides at 8 meters and less,	54.09 instead of 50.
Among those hearing on one or both sides at 4 meters and less,	64.36 instead of 50.
Among those hearing on both sides at 2 meters and less,	67.70 instead of 50.

These numbers prove distinctly that there was not alone some influence on the rate of progress, but that a successive increase of this influence can be demonstrated corresponding to the degree of the hearing defect present.

Bezold calls attention, too, to the fact that the hearing of defective children varies, so that sometimes they can follow the instruction quite well and then again not at all. Especially is this true of those suffering from tubal catarrh. This intermittence and remittance of defective hearing is the main reason why relatives and teachers do not believe the children to be hard of hearing, but merely inattentive; therefore, teachers particularly cannot be too often impressed with this condition. Bezold's experiments did not show increase of defective hearing with age.

Von Gossler.—Von Gossler, Prussian minister of education, states that since it was hinted from the medical side that the pupils of higher schools were hindered in their mental development through hardness of hearing, he thought it necessary to ascertain the facts in the case. So on February 3, 1885, he sent out an order to the provincial school boards that in all the higher schools, and the preparatory schools of the same, should be ascertained how many hard-hearing pupils were in each class, and how many of the same were hard of hearing upon their entrance into the schools. Also in those cases known to have occurred in the school, the causes of such were to be found out, and whether anything had been done on the part of the school to make possible to the hard-hearing pupils participation in the instruction and by what means. Medical coöperation in this investigation was not deemed necessary. For if the hardness of hearing of a son, whom they entrust to the school, is known to the parents, they are not likely to omit to mention this fact in the interest of their son, but even if this is left undone or if a beginning of hardness of hearing has remained unknown at home, yet the pupil entering into the numerous classes for instruction and the other intercourse with the pupils brings so abundant opportunity for observation that an important case does not easily remain unnoticed. It is thereto to believe with confidence that the regular teacher of each class in union with the other teachers of the same class is in position to point out the hard-hearing pupils of the same. What proportion in the hindering of the faculty of hearing is to be counted as hardness of hearing was not prescribed, in consideration of the difficulty of a fixed, determined measure. The lack of a fixed limit has probably resulted in a pretty wide reckoning of pupils among the hard-hearing; at any

rate the remark is frequently found that special rules of the school in the interest of the hard-hearing—for example, by assignment of place in the neighborhood of the teacher—can be given up, as the pupils pointed out as hard-hearing are found to be hindered at no place in the school-room from following the instruction. Through the consideration of these circumstances the assumption is verified that the numbers exclusively resting upon the observations under the authority of the school boards furnish an essentially correct picture of the extent of hardness of hearing among the pupils of the higher schools.

The number of hard-hearing pupils amounted to 2.18 per cent. in all the higher schools of the whole monarchy, and 1.80 per cent. of all the pupils of the preparatory schools connected with them. The percentage of hardness of hearing in any one province does not change much from the average, as the highest in any is 2.48 per cent. and the lowest is 1.57 per cent. Whether these differences have their cause in local and climatic conditions or in an unlikeness of scales in the reckoning of pupils among the hard-hearing, at any rate the hard-hearing pupils form so small a part of the number of pupils that it is possible, through proper placing and careful attention, practically to lighten their hearing so that they may understand the speech of the teacher as well as do their fellow-pupils. From the statistics gathered, it is shown that not a single school neglects this consideration. Also, when a pupil is found not to be able to follow the instruction on account of hardness of hearing, the parents or relatives are notified that further attendence is not to be expected of this pupil.

Of the 2.18 per cent. of the hard-hearing pupils of the higher schools, 80 per cent. of them, or 1.74 per cent. of the whole number of pupils, were afflicted already upon their entrance into the schools; and of the 1.80 per cent. of the hard-hearing pupils of the preparatory schools, 79 per cent. of them, or 1.50 per cent. of all the pupils, were afflicted at entrance upon the schools. So only in .44 per cent. of the pupils of the higher schools and .31 per cent. of the preparatory pupils did hardness of hearing take its beginning at the time of school-attendence.

One might be led to conclude that because hardness of hearing shows a higher percentage in the higher schools than in the preparatory schools, then must the regulations, etc., be the cause of this increase. But it has been ascertained that the diseases of childhood—measles, scarlet fever, diphtheria, etc.—which cause at least one-half of the hardness of hearing, occur most frequently in the years close after the ninth year of the child, and as the eleventh year usually occurs after their entrance into the higher school, then is it shown that the diseases of childhood and not school regulations cause this increase. This is further shown by the fact that hardness of hearing does not increase with the years of the classes, but the distribution among the various classes seems as only a mere accident. Again, as influences which cause diseases of the ear occur outside of the school the same as in the school, then these diseases are not to be considered as a specific result of the school and its regulations.

RUSSIA.

Reichard.—Reichard begins his paper by stating that the questions, "How stands the condition of the deficient hearing to the good hearing in the school, and, what influence does the deficiency of

hearing exercise upon the spiritual unfolding?" till now[1] have been passed by with much indifference, as if they, truly, did not present an important subject, and it is almost wholly inconceivable that in the diligent and exceedingly productive medical literature, thus far no complete publications thereupon are to be found. Although he may not be able to reach a complete conclusion on these questions, yet Reichard hopes to stir up wider research in this direction.

In making his investigations on the reach of hearing, Reichard used his medium-loud ticking watch, at the same time using with this a tape-line, marked off in English feet and inches, which he held pressed closely over and before the ear, on the head, of the child examined. The examinations were always carried on in a wholly still room, all clocks being stopped or taken out of the rooms. When a child made doubtful statements the measuring was repeated after a pause or on another day. In case that the reach of hearing of the two ears was different, that of the better ear was taken as the distance at which the child could hear.[2]

There were 1,055 school children examined, 683 boys and 372 girls, in age from 7 to 15 years, of whom the greater part were between 9 and 13 years of age. From these investigations Reichard found the following classes:

PUPILS CLASSIFIED ACCORDING TO REACH OF HEARING THE WATCH.

DISTANCE.	Boys.	Girls.	Total.
0 to 10 inches.	38	21	59
10 " 20 "	116	60	176
20 " 30 "	171	84	255
30 " 40 "	167	91	258
40 " 50 "	135	67	202
50 " 60 "	41	40	81
Above 60 inches.	15	9	24
Totals.	683	372	1,055

From this Reichard estimated the average reach of hearing of a medium-loud toned watch for the normal ear to be at 20 to 30 inches. Thus of the 1,055 school children, 235 or 22.275 per cent. (of the 683 boys, 154 or 22.248 per cent., and of the 372 girls, 81 or 21.774 per cent.) heard the watch badly—under 20 inches. These

[1] Granting that there is as much defective hearing among school children as these various investigators claim to have found, it does truly appear strange that this paper of Reichard's, appearing in 1878, should have been the first notice of any testings or inquiries upon this deficiency; but stranger is it that there has not been more investigations since then than have been made.

[2] Burgerstein, in speaking of Reichard's work, gives *Uhr* and *Fuss*, Gesunds. in der Mittl., p. 25; Burnham in translation of Burgerstein uses *clock* and *feet*, PED. SEM., Vol. II. p. 495; Ayers in his translation of Weil's reference to Reichard gives *watch*, Arch. of Otol., Vol. XI. p. 33; and Furst in his translation of Bezold's reference to Reichard gives *watch* and *feet*, Arch. of Otol., Vol. XIV. p. 159. But as Reichard states that 24 heard at 60'' and beyond, and as it is hardly possible that anyone can hear a medium-loud ticking watch at 60 feet, and otologists use '' to designate inches, I have interpreted his examinations as having taken place with a *watch* (Uhr) and recorded in *inches* (''). See St. P. Med. Woch., Vol. III. p. 241.

figures show very little difference in the sexes, although the girls have a little more favorable per cent. than the boys. Very seldom was found entirely similar sharpness of hearing in both ears of one and the same child. This was found to be the case in only 109 pupils, or 10.331 per cent. of the 1,055. In a small majority of the children the left ear heard better than the right.

The injury to the hearing through measles, scarlet fever, and small-pox, was greater among the country children than among the city children, which is attributed to the less attainable medical aid and less careful nursing received by the country child having these diseases. But with the exception of the children so diseased, it was found that the hearing of the country children was in general very much better than the city children.

Reichard also found that the hearing among the children of the Slavonian race was very much better than among those of the Germanic race. This he thinks is true not because of any race difference, but of the greater care and culture of the skin by the Slavs, among whom the bath-tub is used more than among the Germans.[1] Dirt and foulness of the skin, of the clothing, and of the dwelling room, exert a harmful influence upon the entire bodily unfolding of the growing child, and especially so upon his hearing. This was right plainly shown in the remarkable contrast between the hearing of children of a free school in the suburbs of the city and of those attending the "Marien-Schule des Frauenvereins auf Hagenshof." In the first school, to whom children of the poorest people belong, was found among 48 pupils only a single one who was able to hear Reichard's watch something above 50 inches distant, while 22 of these heard the watch not at all, or only at a very small distance from the ear. These children showed by their lean, flabby appearance, paleness of skin, often dull expression of countenance, slovenly dress, uncleanliness of hands and face, disorderliness of their hair, and a disagreeable smell which clung to them, that they were cellar-dwellers. On the other hand, the girls of the "Marien-Schule" presented a remarkable contrast. This school, lying beyond the Dwina, free and high, surrounded with open woods, situated in beautiful, healthful suburbs, gave from the tests upon the children hearing similar to that of country children. Truly this school occupies an exclusive place in hearing among the schools examined. These children were cleanly and neat, open in speech, and modest. Previous to this investigation very great indifference had been shown by the schools in regard to the hearing of the pupils, but since he has shown the condition of affairs, the teachers are beginning to examine into the matter, taking this work, and also learning from the parents of the capacity of hearing of the pupils, and are watching it.

Reichard says that certainly the child can distinguish the voice farther than he can the watch, but the watch gives the comparative measure for the faculty of hearing among two or more persons; and that pupil who hears the watch only at 10 inches will hear the voice of a person—say, that is ten times as loud as the watch—only at ten times the distance, or 100 inches, and hence must be seated nearer the teacher than one hearing the watch at 50 inches.

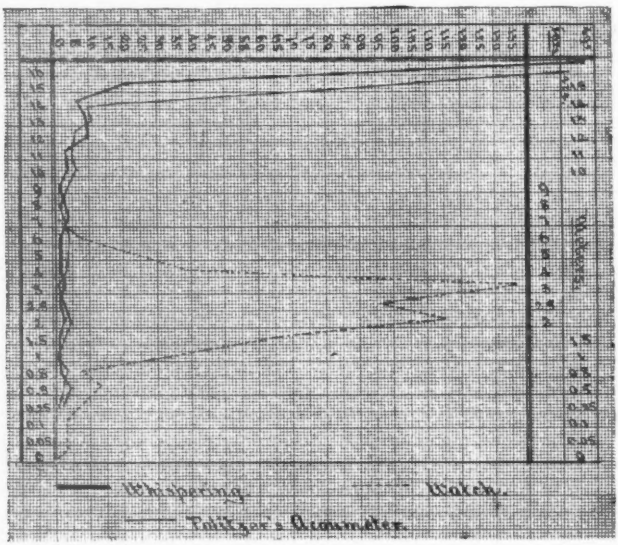
Lunin.[2]—Lunin examined the ears of 281 students of a female school in St. Petersburg, 8 to 20 years of age, in respect to sharpness of hearing by means of the watch, whispering, and Politzer's

[1] It is unnecessary to state that the German writers quoting Reichard's work, omit to note this difference.

[2] The articles in Russian (two by Zhermunski and three by Lunin) were translated for the writer by the kindness of M. Joseph de Perott, Docent in Mathematics, Clark University.

acoumeter. At first he ascertained and noted that the distance at which the normal ear could hear his whisper was from 22 to 23 meters, Politzer's acoumeter at 21 to 22 meters, and the watch at 2 to 3 meters. While whispering he was careful to whisper only with the expired air and equally the same at all times. Each student was given a blank with certain questions to answer. Also each was examined in regard to the condition of the tympanum, the nose, and the throat. From the testings, the answers to his questions, and the examinations, Lunin made out the following figures, tables, and conclusions:

FIG. 1. Curves of Hearing—Whispering, Politzer's Acoumeter Watch.



In Fig. 1 are graphically portrayed the results of the examination of the 562 hearing organs. From this it is seen that the curves of the results from Politzer's acoumeter and the whisper almost coincide. Both go down quickly and then keep almost the same height. While the watch curve begins at 7, rises quickly, and then quickly descends. In Fig. 2 is shown the hurtful influence of catarrh of the throat and turbidness and abnormal reflex of the drum-head upon the hearing. On account of smallness of rooms so as not being able to get the entire reach of hearing the whisper by all, as some ears heard beyond 16 meters (Lunin's standard for normal hearing), the reach of hearing the watch is used for comparisons. It is seen that the three curves of disease rise the more quickly as the watch curve descends. Although Lunin takes two meters as the average of normal hearing for the watch, yet he thinks it is perhaps true that the normal ear hears the watch at a greater distance, and the ear that hears the watch at two meters only is in all probabilities somewhat defective.

FIG. 2. Disease Curves Compared with the Watch Curve.

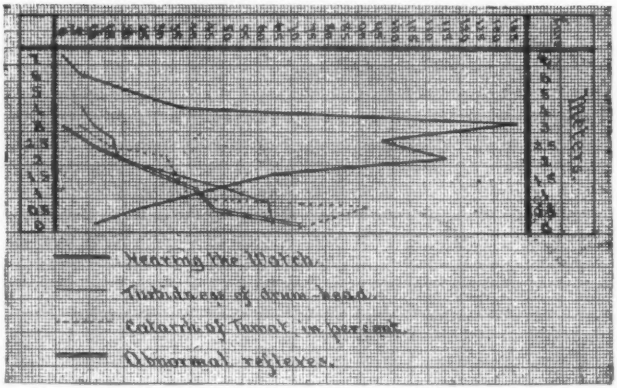


TABLE I. RESULTS OF INVESTIGATIONS OF HEARING BY MEANS OF WHISPERING AND POLITZER'S ACOUMETER, ACCORDING TO AGE.

AGE.	METHOD OF INVESTIGATION.	METERS.																
		16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	1-0
8	Whisper.	8	2												1			1
	Politzer.	8													1			1
9	Whisper.	22	2								1		1					
	Politzer.	22	3	1								1		1				
10	Whisper.	63	5	2	1	1					2							
	Politzer.	61	4	3	1	1		2					2					
11	Whisper.	53	3	2	2	1			1									
	Politzer.	52	4			3	1		1			1						
12	Whisper.	65	2			2												1
	Politzer.	66	1				1	1										1
13	Whisper.	44	5	1	1										1			
	Politzer.	46	3	1	3											1		
14	Whisper.	56	6			1		1								2	1	
	Politzer.	56	3	2				1										2
15	Whisper.	58	1	1		1		1		1		1					1	1
	Politzer.	53	5	1			1			2					1	1		2
16	Whisper.	53		4	1	1		1		1		1						
	Politzer.	49	3	1	2	1		2		1	1	1		1				
17	Whisper.	45		1	3	1	1									1		
	Politzer.	44			3	2		1		1						1		
18	Whisper.	15				1	1							1				
	Politzer.	14	1				1						1			1		
20	Whisper.	1			1													
	Politzer.	2																
To.	Whisper.	483	30	8	9	8	2	3	1	2	3	2	1	1	2	2	2	3
	Politzer.	473	27	9	9	7	4	7	3	2	1	3	3	2	2	4		6

TABLE II. DISTRIBUTION OF RESULTS OF THE INVESTIGATIONS OF HEARING BY MEANS OF THE WATCH ACCORDING TO THE AGE.

AGE.	METERS.														TOTAL.
	7	6	5	4	3	2.5	2	1.5	1	0.8	0.5	0.2	0.1	0.05	
8					2	2	4		2			1	1		12
9			1		7	5	5	3	3		1	1			26
10		1	1	5	15	17	12	9	5	4	5				74
11				3	15	8	13	11	9		3				62
12			2	3	9	22	17	11	4		1			1	70
13	2	2	1	1	17	6	16	2	4	2			1		54
14		1	1	7	22	11	7	8	3		2	1	1		64
15			2	7	17	4	18	7	4	1	3	2	1		66
16		1	6	5	15	8	11	7	6	1	1	1			62
17		1	2	4	14	13	8	3	5		1	1			52
18			3	1	3	1	4	3	1			2			18
20						1		1							2
Total.	2	6	19	36	136	98	115	65	46	8	17	9	4	1	562

TABLE III. DISTRIBUTION OF ONE-SIDED AND DOUBLE-SIDED HARDNESS OF HEARING (WHISPERING) ACCORDING TO AGE.

AGE.	TO 16 METERS. BOTH EARS.	FROM 16 TO 8 METERS.		FROM 8 TO 0 METERS.		TOTAL.
		ONE SIDE (THE OTHER SIDE GREATER THAN 16 METERS).	BOTH SIDES.	ONE SIDE (THE OTHER SIDE GREATER THAN 8 METERS).	BOTH SIDES.	
8	4		1		1	6
9	11		1		1	13
10	29	5	2		1	37
11	24	5	2			31
12	30	4		1		35
13	18	7	1	1		27
14	29	1	2		1	33
15	29		2	1	1	33
16	26	2	1	2		31
17	18	6		1		25
18	7	1		1		9
20	1					1
Total.	226	31	12	7	5	281

TABLE IV. DISTRIBUTION OF THE DISEASES OF THE EAR ACCORDING TO THE ACUTENESS OF HEARING THE WHISPER.

Number of hearing organs which hear the whisper at the distance.	16 m. 483	15-8 m. 63	8-0 m. 16	Total.	Per Cent.
Wax in ear. Stopping the whole surface.	16	5	1	22	3.9
Wax in ear. Not stopping " "	36	19	5	60	10.6
Abnormal reflex.	59	33	10	102	18.1
Anomalies of drum-head. Hyperæmia.	5	3		8	1.4
Anomalies of drum-head. Turbidness.	82	37	13	132	23.4
Anomalies of drum-head. Calcification.	4	4		8	1.4
Indrawn drum-head.	58	30	9	97	17.3
Cicatrices on drum-head.	14	14	7	35	6.2
Atrophy of drum-head.	6	4		10	1.7
Piercing of drum-head. With flow.		2	4	6	1.06
Piercing of drum-head. Without flow.	3	2	1	6	1.06
Former diseases of the ear. Flow.	15	12	2	29	5.17
Former diseases of the ear. Hardness of hearing.	13	6	2	21	3.7
Former diseases of the ear. Noise.	10	2	4	16	2.8
Former diseases of the ear. Pain.	12	3	4	19	3.3
Heredity.	10	5	1	16	5.6
Catarrh of the throat. Acute.	16	3		19	7.
Catarrh of the throat. Subacute.	4			4	1.4
Catarrh of the throat. Chronic.	43	19	6	68	23.6
Catarrh of the throat. Granulated.	37	11	2	50	17.7
Hypertrophy of tonsils.	14	2	2	18	6.7
Chronic cold in head.	27	10	10	47	16.6

TABLE V. DISTRIBUTION OF THE DISEASES OF CHILDHOOD ACCORDING TO THE HEARING (OF THE WHISPER).

Distance.	16 Meters.		16-8 Meters.		8-0 Meters.		Total.	
No. of hearing organs.	483	Per Cent.	63	Per Cent.	16	Per Cent.	562	Per Cent.
Scarlet fever.	166	34.3	21	33.3	9	56.2	196	34.8
Measles.	406	84.0	52	82.5	12	75.0	470	85.4
Diphtheria.	79	16.3	9	14.3			88	15.6
Roseola.	100	20.7	6	9.5	2	12.5	108	19.2
Small pox.	14				2		16	
Meningitis.	2						2	

Out of 562 ears, Lunin found 79 ears that could not hear whispering up to 16 meters, which distance he took as the standard; 24 pupils were defective in both ears and 31 in one ear only. Estimating by ears, there was 14.5 per cent. of defective hearing. Counting only those as having impaired hearing in whom both ears

were defective, the percentage of defective hearing is only 8.5. But counting all as having impaired hearing who were defective in either one or both ears, then the percentage of defective hearing is 19.5.

In regard to the influence of hardness of hearing upon the mental development and progress of the students, Lunin gives the following not uninteresting data : Of 226 students who heard whispering with both ears at 16 meters or more, 119 had a record for good work, 84 satisfactory, and 23 bad. Of 43 hearing in one or both ears from 16 to 8 meters, 11 had a good record, 20 fair, and 12 bad. Of 12 hearing in one or both ears from 8 to 0 meters, 1 had a good record, 5 fair, and 6 very bad. Thus is shown that the more deficient the hearing, the poorer the pupil in his work. Also deficiency of hearing has great influence upon the character of the pupil, often causing him to become obstinate and ill-disposed. Even if he tries to follow the instructions of the teacher his hearing prevents. These hard-hearing ones are generally considered lazy, inattentive and dull by their teachers. The great mass of hard-hearing pupils are unable to keep with their classes, and hence remain in the lower grades. Their capacity for hearing also changes with the weather.

In many schools pupils are seated in accordance with their rank in class, the best sitting nearest the teacher and the poorest farthest off, thus causing these hard-hearing ones (who constitute the very large majority of the poor pupils) to be farthest from the teacher. In fact the seating should be so arranged as to have the hard-hearing ones nearest the teacher, and the teacher should pay very much attention to them.

Zhermunski.[1]—Zhermunski's investigations were carried on in the St. Petersburg city schools,[2] by means of whispering, the watch, and Politzer's acoumeter, upon 2221 school children, 1318 boys and 903 girls, from 7 to 11 years of age, in fifty different schools.

Zhermunski states that his purpose was :

1. To find out the percentage of defective hearing pupils to the normal hearing.
2. To investigate in each case the particular disease which produced the particular case of hardness of hearing.
3. To determine the etiology of the cases.
4. To show the influence of the diseases of the ear upon the mental development of the child.
5. To determine the influence of the noxious flow from the ear on the afflicted person and on his fellows around him.

A few days before the examination Zhermunski gave to the pupils blanks containing the following questions to be answered with the aid of the parents and teachers :

1. Have you had at any time before this any disease of the right or left ear? When?
2. Have you had a flowing from one or both ears? When?
3. How long did the flow last? Was it continuous or only from time to time? With or without odor?
4. Have you any flow now? Right or left ear? How long?
5. Have you any continuous or temporary hardness of hearing? Right or left ear? Any pain or noise in either?

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[1] This name is translated Shermunski in German writings.

[2] The commissioner of education gave permission to Zhermunski for this work. About two years later the school board of London refused Warner permission to investigate. Recall also Sexton's troubles.

6. Are you subject to cold in your head? Is it difficult for you to breathe through the nose? Do you have to keep your mouth open, particularly during sleep?

7. Is your throat sore? How often?

8. Have you had any of the diseases of childhood: scarlet fever, measles, roseola, chicken pox, small pox, diphtheria, typhus, inflammation of the brain?

9. Did the flow from your ear or deafness begin during these diseases?

10. Does your father or mother, grandfather or grandmother, uncles or aunts or their children, suffer or have suffered flow from the ear or deafness? At what time did deafness appear in them—in youth, manhood, old age, or was it congenital?

In the blanks also were spaces for the teachers to put down the mental condition and standing of the pupils.

To each school of 45 or 50 pupils, two days were given of 1½ hours each day. On the first day the hearing of each pupil was investigated by means of whispering and Politzer's acoumeter. The class room, and the adjoining rooms if they were in direct line with the class room, was marked off into meters by means of a chalk line on the floor. In order to get as complete silence as possible, all noises were hushed, also the clocks were stopped. The pupil was placed with one ear toward the wall and the other toward the investigator (Zhermunski). The ear to the wall was closed by the pupil with his finger. Another pupil was placed near the pupil being examined to see that he was not told by other pupils, kept his finger in his ear, and did not look at the examiner. The examiner stood at the opposite side of the room from the pupil at the longest distance possible, whispering in as even a tone as he was able, which whispering the pupil must repeat. The distance at which the pupils could distinguish the words was marked down by the teacher. The other ear was then investigated in the same way. In testing with Politzer's acoumeter, the pupil must count the number of strokes of the hammer.

On the second day the ears, nose and throat of each pupil were examined by medical methods.

The rooms being of different sizes, varying from 10 to 20 meters in length, Zhermunski was not able to find exactly the average reach of normal hearing for all the pupils, but he was able by a method less exact to reach the following conclusions.

By this method the pupils were placed in four groups by the whispering test, and into three groups from the tests by Politzer's acoumeter, as shown in these tables:

GROUPS ARRANGED WITH REFERENCE TO THE REACH OF HEARING.

Whispering.	Number.	Per Cent.
Number of hearing organs examined.	3794	
Group I. Ears hearing from 24 to 16 meters.	3160	83.27
" II. " " " 16 " 12 "	438	11.55
" III. " " " 12 " 8 "	153	4.03
" IV. " " " 8 " 0 "	43	1.13
Politzer's Acoumeter.		
Number of hearing organs examined.	3360	
Group I. Ears hearing from 18 to 12 meters.	2616	86.85
" II. " " " 12 " 9 "	307	9.10
" III. " " " 9 " 0 "	137	4.07

Zhermunski counts the hearing organ deficient that hears the whisper at 16 meters or below, and Politzer's acoumeter at 12 meters or below. So that among 3794 ears examined by whispering he found 16.7 per cent. defective, and 3360 ears tested with Politzer's acoumeter showed 13.17 per cent. defective.

Among the 2221 pupils there were 388 pupils, or 17.42 per cent.—221 boys, 16.76 per cent., and 167 girls, 18.49 per cent.—that presented diseased organs. Of these he thinks that 80.9 per cent. could receive a more or less complete healing by proper management.

The influence of hardness of hearing upon the standing of the child in his work is shown here in the ratio of the unsatisfactory in their studies to those satisfactory.

In pupils hearing the whisper in both ears from 24 to 12 meters, the ratio of the satisfactory to unsatisfactory is 4.19 to 1; those hearing from 12 to 8 meters, the ratio is 2.6 to 1; from 8 to 0 meters, 1.7 to 1. Among the pupils hearing Politzer's acoumeter in both ears from 12 to 8 meters, the ratio of the satisfactory to the unsatisfactory is 2.96 to 1; in those hearing it from 12 to 8 meters in one ear and 8 to 0 in the other ear, the ratio is 1.52 to 1. Thus is shown that capacity for work decreases as hardness of hearing increases.

In his work Zhermunski used this blank given below:

No.	Given Name.	Surname.	Age.	Ear.	Range of Hearing in Meters.			Condition of the Auditory Canal.			Modifications of the Drum-head.				Flow from Ear.	Naso-pharynx.	Throat.	Remarks.
					For Whispering.	For Politzer's Acoumeter.	For Watch.	Inflammation and other troubles.	Plugged with wax.		Reflexes.	Color and Texture.	Changes of Form.	Perforations.				
									Complete.	Incomplete.								
				Right.														
				Left.														

DENMARK.

Schmiegelow.—Schmiegelow examined 581 school children of Copenhagen, in age from 8 to 14 years. The examination was carried on in the inspector's office, in which the greatest distance between operator and subject could be but 7 meters. He divided the pupils into three classes: 1. Those who heard the pronounced words only at a distance of 2 meters or less were placed in the "bad-hearing" class; 2. Those hearing from 2 to 4 meters went into the "defective-hearing" class; 3. Those who heard at 4 meters or above were placed in the "good-hearing" class. The reach of hearing was also tested with the watch, which was heard by the normal ear at 150 centimeters. He examined the auditory canal and middle ear of each pupil, the nose with a rhinoscope, the throat, and ascertained the amount of adenoid growth in the naso-pharynx of each.

At the beginning of the examinations the children were brought ten at a time to the office and their names and ages were taken. In testing with the watch the pupil closed one ear with his finger when the other was being tested, his eyes were blindfolded, and then he tells when he hears the watch with the open ear, Schmiegelow in the meantime approaching from a distance towards the open ear of the pupil with watch in hand. The test was made again and again, and only when the place of hearing was often mentioned as the same by the pupil was the distance marked. The children were tested in regard to hearing the whisper partly by numbers and partly by single words, great care being taken to pronounce always as near as possible the same.

Schmiegelow found 35 pupils, 12 boys and 23 girls, belonging to his "bad-hearing" class, as not being able to hear the whispering voice with either ear at a distance of 2 meters; 261 pupils, 140 boys and 121 girls, fell into the "defective-hearing" class, as being able to hear whispering only at 2 to 4 meters; and the remaining 285 pupils, 144 boys and 141 girls, came into the "good-hearing" class, being able to hear whispering above 4 meters. But there were only 87 pupils, 47 boys and 40 girls, of the whole 581, who heard the whispering in both ears at 6 meters and upward.

After this work he asked the teachers to point out the "poorly-gifted" ones of the 581 children examined by him, and they designated 79 pupils as such. Of these 79 children, 15 had a reach of hearing (whispering) of below 2 meters, 36 from 2 to 4 meters, and 28 only exceeded 4 meters. So about two-thirds of the "poorly-gifted," 51 of the 79, had defective hearing. Again, of the 35 whose reach of hearing was below 2 meters, 15 of them, 43 per cent., were pointed out by their teachers as "poorly-gifted;" of the 261 whose reach of hearing was between 2 and 4 meters, 36 of them, 13 per cent., were "poorly-gifted;" and of the 285 whose reach of hearing was above 4 meters, 28 of them, or 10 per cent., were "poorly-gifted." Truly the worse the children heard the more "poorly-gifted" they were.

Schmiegelow shows the results of the testings in the following interesting way:

Distance at which Whispering was Heard.		Number who Heard Whispering at the Named Distance.	
One Ear.	Other Ear.	Boys.	Girls.
0. meter.	0. meter.	0	1
0.10	0.10	0	1
0.25	0.10	1	4
0.25	0.25	1	2
0.50	0.	1	0
0.50	0.10	0	1
0.50	0.25	0	2
0.50	0.50	1	2
1.	0.10	2	1
1.	0.50	3	5
1.	1.	3	4
2.	0.10	1	3
2.	0.50	8	2
2.	1.	6	9
2.	2.	13	13
3.	0.	0	1
3.	0.10	0	1
3.	0.50	2	1
3.	1.	2	3
3.	2.	27	17
3.	3.	25	25
4.	0.	0	0
4.	0.10	2	3
4.	0.50	4	1
4.	1.	0	0
4.	2.	8	2
4.	3.	22	25
4.	4.	20	15
5.	0.	0	0
5.	0.10	0	0
5.	0.50	1	1
5.	1.	1	0
5.	2.	4	0
5.	3.	19	12
5.	4.	13	22
5.	5.	24	23
6. and over.	0.	0	0
6. " "	0.10	0	0
6. " "	0.50	0	1
6. " "	1.	1	3
6. " "	3.	10	8
6. " "	4.	8	18
6. " "	5.	16	13
6. " "	6.	47	40
Total.		296	285

Sound-Blindness.

Under this head are given the two following records of work done in England and in America, which at least one of the investigators believes is something entirely different from ordinary deafness. Gellé, as may be noticed, gives some examples of this, but he makes no such distinction as sound-blindness.

Tarver.—The difficulties which beset some persons in learning to spell, and in learning how to pronounce foreign languages, suggested to Tarver the possibility that there is such a thing as sound-blindness,[1] an inability to distinguish particular shades of sound arising from some organic defect in the ear which is distinct from what we ordinarily understand by deafness.

His attention was first called to this by noticing that a small boy of nine in writing down a line of poetry which he had learned by heart, had spelled the word *very*, *voght*. On trying a few experiments it was found that the boy could hear no difference between *very*, *perry* and *polly*, and yet, Tarver says, the child was not deaf. The boy had had very great difficulty in learning to read. On inquiring of the teachers it was found not uncommon to meet with children slow to learn to read, because sounds, different to their teachers, are not different to them.

A want of power to distinguish vowel sounds may be the cause of bad spelling in common words as much as carelessness or weakness in the machinery which connects the movements of the hand with the orders of the ear. Yet there is as much inability to distinguish consonant sounds as vowel sounds; and the confusion caused by explosive consonants is, however, more remarkable than that from vowels.

A class of eleven boys, averaging ten and a half years of age, were tested with some short ordinary words, which nearly all got right, and then with words specially to test the power of hearing, some of which, it was hoped, the subjects of the experiment had never heard before. Here are the variations of five words:—

	different.	capable	ultramarine	spectroscope	Epaminondas
1.	dirfreant[2]	capbul	ultremean	spaccrow	apnonos
2.	different		ultramarine	specorourscope	aparmondas
3.	diferent	capeperbul	altrermerine	speckshow	oponedondas
4.	diferrent	capperble	altrermerein	speckros-cop	achappynomeen
5.	diferant	cameble	oltremer	spkerrope	appanandex
6.	drifrent	capable	untummerrein	specteroskop	eupameondeous
7.	diffrent	capabybely	ultriean	spesptrocope	emeandass
8.	drifent	capebibel	ultrenu	spectuscope	epermondes
9.	different	capebale	ultermeriem	speckirocope	opporymondas
10.	differant	ackable	ultomarien	spreting	apanenondes
11.	differint	caperble	ultrumeree	spatroscope	oppongamanges

The room was a small one and the words were slowly pronounced twice, each word being written immediately after it had been read out. The majority of these boys are unusually intelligent. Twenty words in all were read out. Among them were *yellow*, which all got right; *instance*, five right: one of the best readers gave *insentress; aniline*, of which there appeared these variations: *haniyne, anileling, anelile, animene, aleline.* The remainder of the words were spelled

[1] Prof. Joseph Le Conte, in *Science*, Vol. X. p. 312, says of this term that "in so far as the phenomenon is physiological at all, the defect is *timbre-deafness*. But it is probably, largely at least, a defect of perception, and not of sensation, and therefore psychological and not physiological."

[2] The italicised vowels show interchange in the hard-vowel scale.

at any rate phonetically correct. (They are not given in his paper.)

Want of expression in the use of arbitrary connection between signs and sounds are shown here, which may be improved in course of time; but if a particular phonetic mistake frequently recurs, such as the substitution of an *l* for an *n* in *aniline*, such shows defect either in the writer or the dictator, and if shown not to be in the dictator, then must be looked for a defect of ear or hand, or both, in the writer. Suppose a subject is found who cannot recognize a word after the correct spelling has been shown, while others have no difficulty, then the ear must be at fault; and if it is found that this same individual can recognize some sounds and not others, then the phenomenon of sound-blindness is established, and so is presented a satisfactory reason for the fact that some persons seem to spell naturally, while others never learn; as, indeed, how should a man learn to spell even phonetically to whom not only the printed sign, but also the distinctions of sound, are arbitrary and conventional? and how should he not learn whose ear is a torturing conscience? Sound-blindness will account for dialectic variations. The ear being, as physiologists tell us, an even more delicate and complex structure than the eye, we can understand that the physical conditions of certain localities may produce insensibility to particular variations of sounds; perhaps the interminable rattle of London may account for the awful vowel system of commercial men in the metropolis.

Wiltse.—Through suggestion of Dr. G. S. Hall, calling attention to review of Tarney's work in *Science*, Miss Wiltse was led to make the following tests:—

In the Boston public schools, Miss Wiltse tested 259 boys, 12 to 20 years of age, from the Latin high school; 223 boys, 13 to 18 years, from the English high school; and 530 pupils, 8 to 14 years, from the Comins grammar school. Standing on the teacher's platform, after testing the pitch and loudness of voice upon the master at the rear of the room, the following words were given: ultramarine, altruistic, frustrate, ultimatum, ululate, Alcibiades, unaugmented. Time was given for the slowest pupils to write the words upon slips of paper, and the words were repeated by the examiner, some as many as five times.

Of the 259 boys, 12 to 20 years of age, in the Latin high school, 84 made corresponding mistakes in the vowel sounds, as, *a*ltramarine, frostrate, etc. Alcibiades suffered least, and Miss Wiltse thinks this so because, perhaps, so familiar to the children. Just here Dr. Clarence J. Blake, the distinguished aurist of Boston, was consulted and he gave the following list of test-words: fan, log, long, pen, dog, pod, land, few, cat. Then the 84 pupils who made the mistakes in the first test were seated in their various rooms on the front row, with the operator at the back of the room. The above monosyllables were used, and pronounced but once. Four of the 84 spelled all the words correctly. *Cat* was not missed by any. A final and individual test was made with a tuning-fork (C 562 v. s.). This was struck with a rubber covered hammer, the pupil being 12 feet away with his back turned towards the observer. Two cases of deafness were found, which were known to the teachers, but not to the master. Several doubtful cases were noticed, but it was a damp day, which caused the fork to give uncertain sounds.

In the English high school 223 boys, 13 to 18, were tested with the polysyllables and 105 made mistakes similar to the ones noted in the Latin high school. Of this 105, 92 misspelled from one to four of the monosyllables.

In the Comins grammar school 530 pupils, 8 to 14, were tested with the monosyllables, and 34 spelled all correctly. In this test the same room was used for all; 16 at a time were tested, with no other pupils in the room and no outside disturbances.

For cat	5	different	words	and	0	blanks	were	given.
" dog	6	"	"	"	1	"	"	"
" fan	7	"	"	"	2	"	"	"
" few	11	"	"	"	10	"	"	"
" long	14	"	"	"	11	"	"	"
" land	14	"	"	"	12	"	"	"
" log	17	"	"	"	10	"	"	"
" pen	18	"	"	"	12	"	"	"
" pod	51	"	"	"	64	"	"	"

The words used for pod were: hove, hoe, hawk, hoved, hoad, hoge, hart, half, hard, hope, hub, hark, hood, pawd, parg, palm, pant, paw, parm, pok, pout, pard, bong, cot, tod, of,—each once; heart, hug, prove, papa, dod, long, tog,—each twice; hollow, path, pot, pob, pop, log, pual,—each three times; hot, cod, pug,—each four times; have, pond,—each 5; fog, 6; park, 10; hard, 25; pog, 26; hod, 36; hog, 85.

As the logographic value of letters is modified by those which precede or follow them, Miss Wiltse arranges the mistakes as they occurred in the words given, one of which will be given here.

Pod.—P labial: b labial, 1; d lingual, 2; c hard, 5; f labio-dental, 6; t aspirate, 6; l liquid, 7; h aspirate, 171; no consonant before o, once. O short: oo in hood, 1; ou in pout, 1; u long, 3; o long, 6; u short, 7; a broad, 7; a short, 12. D lingual: g soft, 1; f labio-dental, 1; m liquid, 2; th, 3; p labial, 3; b labial, 4; ng, 4; l liquid, 5; v labio-dental, 7; k palatal, 13; t dental, 17; g hard, 132; open vowel, 6.

Another and better tuning-fork was used with the grammar school children and differently manipulated (not stated how). Five children were found who could not hear this 12 feet away, and in none had the master or teachers suspected any disorder of the ear. Two of these were among the brightest in the room, and they were seated furthest from the teacher; the others were supposed to be dull and inattentive. After the discovery of deafness these pupils were particularly observed by their teachers and the bright ones were found to have the habit of closely watching the face of anyone speaking, bending to the right or left during dictation exercises in order not to lose sight of the lips.

One circumstance is not without suggestiveness, says Miss Wiltse. A child, seven years old, with peculiarly abnormal development, was pronounced feeble-minded by examining physicians, but was retained in the kindergarten, where it received especial attention and made marked improvement. Dr. Blake kindly examined the child and found that early troubles with the inner ear had occasioned a period of deafness which had arrested mental development. The child is to be sent to the school for deaf mutes to learn the use of his vocal organs, instead of the school for feeble-minded children, the ear to receive meanwhile such treatment as the disorder indicates.

Teaching Deaf Children to Hear.

In these cases given here, Miss Warren has so well shown what patient work and the knowledge of how to proceed have done in the way of teaching children to hear, who were, perhaps, pro-

nounced hopeless cases, that it seems well to put such in this paper, for the encouragement of the teacher of dull, inattentive, poor-hearing pupils. The following words have been said often by the despairing teacher, yet Miss Warren did not at all despair: "The work is extremely difficult. The pupil fails to appreciate what is being done, and has to be helped along contrary to his own wishes. He would much prefer to be let alone." The method of work is not given, but it is stated that the work often has to be given largely through the eye, yet of late there has been great encouragement by the gratifying results from teaching little children through the hearing alone.

Following are notes of some cases under instruction during the past year (1892) in Miss Warren's school for deaf children:—

Case I.—A boy who, at four years of age, after continued efforts to call his attention to sounds, began to notice the clapping of hands, whistling, and a trumpet. At the end of seven months' daily drill he hears a bell, the hand-organ, a canary's song, and the barking of a dog. He evinces much pleasure at singing when near, and turns quickly at the sound of a whistle in an adjoining room, behind closed doors. He can repeat readily a number of words when spoken near either ear, or at a distance of a few inches in loud or low voice. Some of the words have breath sounds, as papa, ship, whip, shoe, flower, and up.

Case II.—A girl, ten years of age. She had no perception of sound until last December. At the end of five months she can hear and repeat a number of words; she can distinguish and give high and low notes very well. When standing outside of a room with doors closed, she can tell when the piano accompanies singing and when the instrument only is heard.

Case III.—A girl, four years of age. Last October, when I saw her first, she noticed the ticking of a watch and heard the music-box and whistle. She made no attempt to repeat the sounds of the voice, and could not locate noises. At the end of six months' instruction she can determine the source of sounds, and has learned people and objects have names. She can repeat readily and distinctly a number of words when spoken a short distance from her ears, as boy, sew, ball, bell, doll, and mouth. She has learned to repeat a little sentence, as "I see baby."

Case IV.—A boy, ten years of age. When three years old, after continued practice, he could repeat a few words heard through a double speaking-tube. At five years he could distinguish about thirty words, if spoken slowly and very distinctly, but he became confused if two or more were repeated making a sentence. When nearly ten his hearing of speech had not improved to any extent, but he would turn quickly at the sound of whistles and bells. After the past seven months' careful work, he can recognize familiar words when spoken at a distance of six feet, and begins to notice what people say in the horse-car and other places. He understands and answers questions spoken some inches from his ear, and in his reading lesson his pronunciation can be corrected through his hearing alone.

Case V.—A girl, five years of age. When four she was considered wholly deaf. As her parents live a long distance from the city, her instruction has been carried on for a few months only at a time; enough has been gained, however, for home training to be possible. The child awoke gradually to an enjoyment of many sounds. Within fourteen months of her first lesson she has acquired quite a vocabulary, and has learned a number of sentences. She expresses her-

self by these words at all times, and uses the sentences properly. She has begun to answer questions, having at first merely repeated them.[1]

Causes of Defective Hearing.

As all well know, the ear is divided into three parts: the external ear, the middle ear, and the internal ear. The middle ear is also called the drum and the tympanum, and the internal ear, the labyrinth. The external ear consists of the auricle and the external auditory canal. The auricle is the larger outside part and is usually called the ear. The external auditory canal extends from the lower inner part of the auricle to the drum-head, running about 1¼ inches inward and a little forward; about the middle of this canal are situated the glands for secreting the wax. The middle ear is a narrow irregular cavity of $\frac{1}{12}$ to $\frac{1}{8}$ of an inch in width and contains a chain of small bones crossing from the drum-head to the inner ear, the minute muscles and ligaments of these bones, and nerves; the cavity is filled with air by means of the Eustachian tube. The drum-head is stretched across the middle ear (the drum) at the lower end of the auditory canal, and it is about $\frac{1}{250}$ inch (or .1 mm.) thick. To it is attached one end of the chain of bones crossing the middle ear. The Eustachian tube reaches down from the middle ear into the upper part of the pharynx. The inner ear is of so complex a nature that its description will not be given here. Hearing takes place from the sound-waves entering the canal and striking against the drum-head, causing it to vibrate. This causes the chain of bones to vibrate, along which the sound is carried across the middle ear to the inner ear, where the impression is gathered by the auditory nerve and carried to the brain.

All children immediately after birth are deaf. This is caused chiefly by lack of air in the cavity before respiration, and also by the temporary closing of the external auditory canal caused by the falling together of its coating. Just how long before the middle ear is filled with air through the Eustachian tube, and just how long the child may continue deaf, is not well determined. Preyer says that if children born at the right time make no movement in the fourth week when a loud sound is made behind them, then there is reason to suspect that such children will remain deaf and dumb. But very great care must be used in this experiment, and even then it is doubtful but that the child may hear a little, for in all probabilities children born with totally permanent deafness are of rather rare occurrence.

Congenital Deafness.—A child may be born with some deformities of parts of the ear. Of 450 children with defective hearing, Sexton found 30 with deformities of the drum-head from perverted development. He tells of a child whose mother suffered from head catarrh, and his grandmother and great-grandmother were very deaf, so this little boy had aural catarrh, and then at three years of age he could not talk on account of this trouble, although a very bright child.

Affections of the Auricle.—The auricle from blows, or being frosted, or from attack of salt rheum, may become inflamed, swell up, and close the entrance to the auditory canal, thus causing deafness.

[1] Under date of Dec. 17, 1892, Miss Warren writes in reply to inquiries in reference to her work: "I have in mind a little pamphlet or volume in regard to the same subject, but have been too hurried and busy to get it in shape for the printer." It is to be hoped that we will soon have her method and that the book will find its way into the hands of every teacher who comes in contact with the "dull child."

The External Auditory Canal.—The auditory canal may be partially closed by inflammation of its lining membrane, or by foreign bodies being placed in it by the child, or it may be filled up with wax. Schmiegelow says that 70 pupils, or 6 per cent. of the hard-hearing ones of his examination, had a greater or less accumulation of ear-wax. Zhermunski found 4.09 per cent. of his hard-hearing pupils having their ears stopped with wax. Sexton gives 52 cases of stoppage by wax, 7 by foreign bodies, and 25 by narrowing of walls by inflammation. Weil gives about 13 per cent. with wax, 7 per cent. of which with plugs. Moure found 100 pupils with plugs of wax in one or both ears.

The Drum and Drum-Head.—The drum of the ear may be more or less affected by a festering, from which flows a fetid matter, which in some cases eats holes in the drum-head. Of 8,715 cases of diseases of the ear examined by Dr. Blake of Boston, 1,085 occurred from purulent inflammation of the middle ear, 581 cases from acute or chronic catarrhal inflammation of the middle ear. Zhermunski found 5.62 per cent. with chronic catarrh of the middle ear and the Eustachian tube, festering of the drum in 4 per cent., and perforation of the drum-head from this festering in 2.52 per cent. He states that in many cases of the festering ears, he could diagnose from a distance through the foul odor. Moure says that chronic catarrh of the middle ear and Eustachian tube is one of the injuries to hearing most observed in children, and he found with such trouble 348 out of 616 defective hearing children, or more than half of them. Sexton found 27 cases of festering. Schmiegelow found 28 ears, 2.8 per cent., affected with festering. None of these could hear whispering at a distance over 3 meters and usually much less; 5 heard at 10 centimeters, 10 at 25 centimeters, and 7 at .5 meter. Weil found .1 per cent. and Bezold .97 per cent. of their examined ears with this festering. Bezold found tubercle bacilli in the festering ears of a child, although he found none in the lungs of the same child. The drum and drum-head also have been injured by boxing and pulling the ears, and by the use of things to get wax, etc., out of the ears. Sexton reports ten cases of hardness of of hearing where the ear had been severely boxed or pulled, causing rupture or strain of drum-head, and that death has resulted from blows upon the ear. As the following stories come so far from over the sea (Italy), they may well show how our own faults appear when at a distance. Mantegazza gives them and says that they were related to him by an authentic physician.

"In one place the teacher has his pupils come to the platform to recite. At the first failure the pupil makes, the teacher grasps him by the ear and pinches it; at the second failure the ear is shaken and grasped tighter; at the third failure the pupil is lifted up by the ear and slung from the platform. Among some of these I have seen, three had blood running from the ear as a result of interior laceration; inflammation set in, and a running sore was made which continued a month, and all three afterwards were hard of hearing."

"A lady who dearly loved her children, but wished them always to obey and quickly, had one child four years old who was somewhat passive and lymphatic and at times stubborn. One day the mother called the child and as it did not come quickly, she went to it, took it by the left ear, and drew it thus through the room. The child, it may have been from pain or only out of willfulness, threw itself on the floor; nevertheless she held the ear fast in her hand and so it received a jerk; when she let go she was astonished to see blood

flowing from the ear. On the following day she sent for me, as the child had a violent fever and was raving. The ear was all swollen and a clump of blood was found in it, also the ear glands and the temporal region were swollen and hot. For more than a year the child had a bad-smelling flow of pus from this ear, and was able to hear only after careful medical treatment and the use of sea-bathing. I saw the child again when it was twelve years of age, at which time it heard badly, especially out of the left ear."

Water in the Ear.—Dr. Sexton says that in surf-bathing the waves may send the water into the auditory canal strong enough to rupture the drum-head, or it may be driven through the mouth into the Eustachian tube up into the middle ear, causing inflammation; also the salt water may remain long enough in the auditory canal to cause inflammation. In strangling, while diving, the water may be forced into the Eustachian tube and thence into the middle ear. He mentions 33 cases of deafness as caused by cold sea-water passing up through the mouth and Eustachian tube into the middle ear; he also gives three cases where water was introduced into the nasal passages and forced up through the Eustachian tube into the middle ear by use of the nasal douche or by sniffing. Dr. Sexton and Dr. Fanning both seriously object to the sniffing of water up the nose.

The Inner Ear.—The consequences of impairment of the nerve of hearing are usually very grave, says Sexton, and cerebro-spinal meningitis and a few other diseases seem to affect this nerve and often leave complete and incurable deafness.

Taking Cold in the Head.—The cold may cause the mucous lining of the Eustachian tube to become swollen and so prevent a sufficient amount of air from going to the middle ear, or the inflammation may go from the throat into the Eustachian tube and thence into the drum, or the ears may become inflamed from sympathy with the nose and throat. All this affects the hearing. Reichard claims that of all things causing deafness to which school children are subjected, *colds* head the list.

Diseases of Childhood.—Many diseases of childhood seem to have a strong bearing upon the hearing of children. Fanning states that there are many children who had perfect hearing and speech the first two, three, or four years, but in consequence of improper attention to their ears, or none at all, during an attack of measles, scarlet fever, or diphtheria, have totally lost all sense of hearing and ability to talk; and that our deaf and dumb asylums are filled with just such cases of "preventable deafness." According to Sexton, scarlet fever is the worst on hearing, but measles, cerebro-spinal meningitis, whooping-cough, and sometimes mumps, cause hardness of hearing. Blake says that 113 of his cases of hardness of hearing were caused by scarlet fever. Lunin shows that of the children he examined, 34.8 per cent. had had scarlet fever, 19.2 per cent. roseola, 85.4 per cent. measles, and 15.6 per cent. diphtheria. Bezold finds that scarlet fever has great influence to bring about defective hearing, diphtheria has some influence, the influence of measles is uncertain, rubeola results are worthless, and meningitis patients are not found in the school. Worrell thinks that too much importance has been given to scarlet fever as a factor in contributing to the number of diseased ears, and that much attention has been drawn to it by the fact of such disastrous results in exceptional cases having followed it.

Cutting the Hair.—Schmiegelow rather laughs at a mother for thinking that hair cutting should have caused her boy's hardness

of hearing,[1] but Sexton says that closely cropping the hair, especially just back of the ears, has been known to be followed by inflammation of the ear. Everyone, perhaps, can recall having caught cold one or more times just after having the hair cut.

Condition of the Teeth.—Dr. Sexton calls especial attention to the fact that the condition of the teeth has a great deal to do in causing hardness of hearing. He states that of the 450 cases of deafness that came under his notice, nearly every one had defective teeth, and 189 of them had especially bad teeth.

The Throat and Nose.—Zhermunski found through his rhinoscopic investigations that in 64 per cent. the disease of the naso-pharynx had led up to affection of the middle ear. Fanning says that from the condition of a "mouth breather" it is but a short step to either or both deafness and the characteristic countenance of such. Lunin gives 46.6 per cent. of the students examined by him, to be suffering from an acute, sub-acute, or chronic catarrh of the throat. Sexton reports 13 cases of "mouth breathers" caused either by obstruction of the nasal passages or from malformations of the teeth. Schmiegelow found rhinitis chronica in 143 children; of these, 13 heard whispering at not more than 2 meters, 86 from 2 to 4 meters, and 44 above 4 meters. He found 107 cases, about 18 per cent., with a more or less hypertrophical condition of the adenoid tissue, although only 28 children showed a very great degree of hypertrophy. He points out the influence which the various nose and throat diseases have upon hearing, in the following table, in which he shows in what degree the reach of hearing stands related always in 100 cases of each disease:

The reach of hearing (whispering) amounts to	Rhinitis chronica.	Pharyngitis chronica.	Adenoid hypertrophy of lower degree.	Adenoid hypertrophy of higher degree.	Tonsilitis hypertrophica.
Below 2 meters in	9	11	17	25	8
Between 2 & 4 m. in	60	58	53	72	45
Over 4 meters in	31	31	30	3	47

Thus it is shown that of those suffering from rhinitis chronica, less than one-third have a normal reach of hearing; the same in pharyngitis chronica, a little less in the milder form of adenoid hypertrophy, but in the stronger form of adenoid hypertrophy there are but three pupils in 100 that can hear well; and in tonsilitis hypertrophy about one-half of the sufferers have good hearing. This table well shows the wonderful bad influences that the adenoid growths have upon the ear, so that "mouth breathers" are usually hard of hearing.

In order to get at the etiology of the diseases of the ear, etc., Bezold furnished blanks to the parents of both bad-hearing pupils and good-hearing ones, containing questions to be answered which comprised: (1) Former or present purulent discharges; (2) Previous diseases of children; (3) Possible connection of the otorrhœa with the latter; (4) The presence of any hereditary tendency. From the replies and from his examinations, Bezold made out the following:

[1] He found that one boy's hardness of hearing, who heard whispering at a distance of 80 cm. only, was caused by the accumulation of wax in both ears, but upon wishing to remove it he was opposed by the mother, who said the hardness of hearing was caused from the boy's having his hair cut, as this was always the case.

TABLE XIX. TOTAL NUMBER BOYS AND GIRLS FROM THE TWO PUBLIC SCHOOLS.

HEARING DISTANCES FOR WHISPERED SPEECH.		NUMBER OF AUDITORY ORGANS.				Total	IN PERCENTAGES OF EACH COLUMN.				Total.
		Abov 16 m.	16-8	8-4	4-0		Abov. 16 m.	16-8	8-4	4-0	
Total auditory organs in both schools perceiving at the above distance.		1659	1189	470	296	3614	100	100	100	100	100
Cerumen.	Hindering examination.	152	127	33	23	335	9.16	10.68	7.02	7.77	9.27
	Apparently occluding.	17	29	16	32	94	1.02	2.44	3.40	10.81	2.61
Normal drum-head reflexes.	Triangular spot or point in or near the umbo.	1437	944	324	113	2815	86.44	79.39	68.94	38.18	77.89
	Sulcus reflex covered by the anterior lower wall of the ear canal.	537	365	145	60	1107	32.37	30.70	30.85	20.27	30.63
Pathological state of the drum-head reflexes.	Normal reflex absent.	35	57	28	27	147	2.11	4.79	5.96	9.12	4.07
	Normal reflex far removed from the umbo towards the periphery.	32	48	49	51	180	1.93	4.04	10.43	17.23	4.98
	Macular reflex *above* the short process.	11	12	5	5	33	.66	1.01	1.06	1.69	.91
	Punctiform, linear or more expanded reflex *behind* the short process.	33	48	24	19	124	1.99	4.04	5.11	6.42	3.43
Color anomalies of the drum-head.	Diffuse reddening or extravasation of blood.	4	4	3	4	15	.24	.34	.64	1.35	.42
	Serum perceptible in the drum cavity.	1	1	5	3	10	.06	.08	1.66	1.01	.28
	Diffuse opacity.	19	27	20	12	78	1.15	2.27	4.26	4.05	2.10
	Circumscribed opacities.	173	172	79	33	457	10.43	14.47	16.81	11.15	12.65
	Calcifications.	22	12	11	10	55	1.33	1.01	2.34	3.38	1.52
	Posterior streak of opacity.	62	54	30	14	160	3.74	4.54	6.38	4.73	4.43
Form anomalies of the drum-head.	Posterior fold.	60	81	67	61	269	3.62	6.81	14.26	20.61	7.42
	Mambrium mallei widened or short process projecting.	15	32	20	15	82	.90	2.69	4.26	5.07	2.27
	Atrophy.	11	17	12	9	49	.66	1.43	2.55	3.04	1.36
	Cicatrix.	11	25	19	15	70	.66	2.10	4.04	5.07	1.94
Perforation of the drum-head	With otorrhœa.		1	3	31	35		.08	.64	10.37	.97
	Without otorrhœa.	5	7	9	14	35	.30	.59	1.91	4.73	.97
Nasal speech.		3	8	17	26	54	.18	.67	3.62	8.78	1.49
Former ear affections.	Former discharge.	64	83	75	96	318	3.86	6.98	15.96	32.43	8.80
	Former impaired hearing.	33	62	39	83	217	1.90	5.21	8.30	28.04	6.00
	Former tinnitus.	35	31	24	19	109	2.11	2.61	5.11	6.42	3.02
	Former ear-ache.	74	96	38	45	253	4.46	8.07	8.09	15.20	7.00
Other history.	Scarlatina.	360	293	117	88	858	21.70	24.64	24.89	29.73	23.74
	Morbilli.	363	628	256	150	1897	51.02	52.82	54.74	50.68	52.49
	Rubeola.	340	255	86	67	748	20.49	21.45	18.30	22.64	20.70
	Diphtheria.	366	276	96	82	820	22.06	23.21	20.42	27.70	22.69
	Meningitis.	30	23	6	3	62	1.81	1.93	1.28	1.01	1.72
	Trauma.			2		2			.43		.06
	Heredity.	166	111	56	45	378	10.00	9.34	11.91	15.20	10.46
Not examined with speculum on account of disease, etc.		45	45	19	7	116					

Suggestions Offered by Various Writers.

Dr. Barr gives the following ten very good suggestions:—

1. Teachers should keep in view the fact that in every class of fifty children, there are probably a dozen or more of them who have some defect of hearing, and who are, therefore, placed at a disadvantage as compared with their normally hearing fellows.

2. Children who are known to suffer from defective hearing should always occupy a position on the bench nearest to the teacher, and if defect is limited to one ear, the child should be placed so that the better ear shall be turned to the teacher.

3. Children whose hearing is very defective, or who are totally deaf, should be taught in a separate class by the German method of articulate speech and lip-reading.

4. In the case of children whose progress is unsatisfactory, and who are inattentive, dull, and idle, their capacity of hearing should be determined by proper tests, and if defective hearing is found, information of the fact should be sent to the parents, and their position in the class so arranged as to minimize the bad effects of the defective hearing.

5. If a child suffers from a discharge of matter from the interior of the ear, he should cease to attend school till a doctor's certificate of fitness is obtained.

6. Boxing on the ears must never be practiced.

7. The class rooms should never exceed twenty feet in length or breadth, or better, a parallelogram of 25x15 feet. The teacher should be at the middle of one of the short sides of the parallelogram, and the number of scholars in one room should never exceed fifty. If, as is frequently the case, the teacher stands in the centre of the long side of a parallelogram, the children to the extreme right and left are badly situated for hearing.

8. In the selection of a site for a new school, a position should be chosen as far removed as possible from noisy works or main thoroughfares. The class-room should be as far as possible from a public street and it should not lead directly off from main staircases.

9. The walls separating class-room from class-room, or from a staircase, should be sufficiently thick and formed of such material as to form bad conductors of sound. Wood, especially fir, is obviously unfitted for entering into the construction of such partition walls.

10. To guard against colds in the head, a common source of deafness in school children, class-rooms should be provided with appliances for ventilation, which would do away with the necessity for opening windows while the class-rooms are occupied by the children.

Dr. Sexton asks for a classification of pupils which will not throw the hard-hearing out of school, nor yet cause them to be compelled to undergo the same methods of teaching and examinations of the normal hearing. He thinks there should be proper tests of the hearing of school children and the grade of hearing established, then those hard of hearing should be placed in classes of not more than twenty and taught by specially prepared teachers.

Dr. Blake gives the following excellent summary of his conclusions from a study of children's hearing:—

1. The frequency of partial deafness in children, during the period of school life, renders it advisable to make some definite provisions in our public school system for compensatory instruction.

Not examined with spe

2. Since partial deafness is a comparative term, some provision should be made for a proper determination of the degree of disability.

3. This may be best accomplished by establishing a series of speech tests, to be used by the teacher, or by instituting competent medical examination at the hands of a medical supervisor of schools; and the creation of such an office in connection with our public school system is strongly urged.

4. Partially deaf children, whose hearing is not so defective as to require special instruction in articulation and lip-reading, are better taught in mixed classes with those who hear well, compensatory advantages being allowed them according to their degree of advisability.

5. Partially deaf children, whose hearing is so defective as to interfere with the natural acquirement of articulation, and to render the ear of little or no value as a medium for hearing, should be accorded the advantage of special instruction, of which education in articulation and lip-reading should form a part.

Conclusion.

As may be noticed, about one-half of this paper is given to the Hearing of School Children. This is done because of its very great importance. There are quite a number of teachers who are ever ready and willing to do all they can for the boys and girls under them; and one purpose of this work is to bring before such teachers the great need of looking after children's hearing and this can best be shown to them by the world's experiments in this direction. I wish to end here by some remarks and questions upon this one topic—*The Hearing of School Children.*

The following table shows the work of the various investigators. The *date* is that of the appearance of the papers upon the subject, and *normal reach of hearing* is the distance at which all pupils hearing below it were counted as having defective hearing. In von Gossler's line the 2.18 refers to the higher schools and the 1.80 to the lower schools. Zhermunski gives results for both whispering and Politzer's acoumeter, so that *W* stands for whispering and *P* for Politzer's acoumeter. Schmiegelow makes three classes, on account of which it is hard to tell just what to put for his defective hearing, hence are given I. for those hearing below 2 meters, and II. for those hearing between 2 and 4 meters. The parentheses around the watch distances mean that though the watch was used the results were given in whispering:

No.	Name.	Place.	Date.	Number of Pupils Examin'd.	Normal Reach of Hearing.			Defective Hearing.	
					Whisper.	Politzer's Aco'met'r	Watch.	Number.	Per Cent.
1	Reichard.	Riga.	1878	1,055			20 in. (?)	235	22.275
2	Sexton.	New York.	1881	570	12 ft.			76	13.33
3	Weil.	Stuttgart.	1882	5,905	15 m.			1,855	31.22
4	Worrell.	Terre Haute.	1883	491	15 ft.			125	25.49
5	Gellé.	Paris.	1883	1,400	8 m.		(1.25 m.)		20 to 25
6	Moure.	Bordeaux.	1884	3,588	15 m.			616	17.15
7	Bezold.	Munich.	1885	1,918	8 m.			495	25.8
8	Von Gossler.	Prussia.	1885						{ 2.18 { 1.80
9	Lunin.	St. Petersburg.	1888	281	16 m.			55	19.5
10	Zhermunski.	St. Petersburg.	1888	W. 1,897 P. 1,680	16 m.	12 m.		{ W. 317 { P. 222	{ W. 16.7 { P. 13.17
11	Barr.	Glasgow.	1889	600				166	27.66
12	Schmiegelow.	Copenhagen.	1889	581	4 m.		(150 cm.)	I. 35 II. 261 } 296	I. 6.02 II. 44.9 } 50.9

Several questions arise in regard to this work:

1. What effect has the school upon the hearing of the pupil? Is it true or not that the defective hearing increases with the age of the pupil? If it does increase, how much of such can be attributed to the school life, and how much to the home life? What can the school do to relieve this affliction? Is it necessary that such pupils shall be placed in separate classes, or seated near the teacher, or given especial attention? In how far can the present school system do any or all of this? etc., etc.

2. How much effect do the diseases of childhood have upon the hearing of children? Is it true that a very great amount of this defective hearing can be traced to these diseases? How much can the school do in preventing this, especially in preventing carelessness in the care of the ears during the time of the disease and immediately afterwards?

3. Is it true that the dull, inattentive, lazy and vicious pupils are the hard-hearing ones, and that by a strengthening of the hearing the whole nature of the child may be changed for the better? Is it true that the children at the foot of the class are there simply through their inability to hear well? Can it be possible that 12 of every 50 pupils have bad impairment of the hearing?

4. Is it true or not that the hearing of country children is better than that of the city children, better of the children of the higher classes of society than of the lower, and of children of private schools better than those of public schools? If so, does the city school, or the public school, have a very great deal to do with this, or is it mostly the home environment?

5. Is von Gossler about correct in his estimate of 2.18 per cent.? or are Weil and Bezold with their 25 and 30 per cent. nearer the truth? or does Sexton, who occupies middle ground between them with his 13 per cent., state more nearly the facts in the case? Is it possible that the medical gentlemen in all these countries have let their zeal to prove that much impairment of hearing exists among school children, run away with their discretion, and hence have placed a large number among defective hearing children, who really are perfectly capable of following the instruction of their teachers? On the other hand have the Prussian minister of education and his school boards in their great desire to prove that the medical people are all wrong, fallen far below the mark, and so failed to put into the defective hearing class a very great number who really belong there?

I am quite sure that every reader of this will agree with me that it would be impossible for all these medical gentlemen together to convince von Gossler and his boards that their results are far, far below the true condition of the matter; and that it would be a waste of breath on the part of von Gossler to try to convince these medical gentlemen that their zeal has led them to go far, far beyond what really exists. This leads to the following conclusion:

That these investigators were honest and painstaking in their work must be admitted. That the work was done for the purpose of ascertaining the facts in the case and not for the sole purpose of simply proving the one side or the other, nor for pecuniary considerations, is quite certain. But such an important thing as the hearing of school children, which bears directly upon the very most inner life of the child, needs to be examined in such a manner as to leave no doubt to any fair-minded person that results are as they should be, and are not procured by means which will prove but one side of the question. In fact this work must be done by a

wholly disinterested party, one who is working for the welfare of the child alone, and who has no professional interests at stake, nor any official position to uphold. Such a one is the truly scientific man, working by the methods of the scientist and seeking for such result as the facts in the case will bring. Such a party should have careful medical and scientific training, and be experienced in the handling and care of children.

It seems to me that this is one of the true lines of work of the pedagogical department of a university,—the training of parties to carry on investigations in this line, and all investigations as regards the child, in a scientific manner. Herein lies the field of new work for such a department,—to study the child scientifically in the laboratory, and then to apply the results of this study in a further study of the child in the home, in the school, and in all the life of the child.

But better than this would be a department in college or university, whose sole aim of study and centre of attention is the child, fastening around him all that is necessary to understand him, thus sending out young men and young women trained in a study of that which is least studied and least understood of nature's products—*the child*. Such work as this in college or university might be known as a department of Paidology.

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1889, p. 105.—Shermunski.—Untersuchen des Gehors der Kinder schulpflichtigen Alters in den Petersburger Stadtschulen. Review.

p. 146.—Mangelhafter Gehörsinn bei Schulkindern in Glasgow. Review of Barr's work.

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1887, p. 257.—The Care of the Ears by the School Authorities. Dr. C. Keller. Review.

p. 257.—Hearing of School Children. Dr. E. Schmiegelow. Review.

1890, p. 191.—Investigations as to the Hearing of School Children. Thos. Barr. Review.

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[1] *The Archives of Otology* and *Zeitschrift für Ohrenheilkunde* are the same, being published simultaneously in America and Germany. The articles of each are translated for the other. The publication has been as follows:

Archives of Ophthalmology and Otology, 1-7, 1869-78.
Separated into { *Archives of Ophthalmology*, Vol. I. 1879.
{ *Archives of Otology*, Vol. I. 1879.

Archiv für Augenheilkunde und Ohrenheilkunde, 1-7, 1869-78.
Separated into { *Archiv für Augenheilkunde*, Vol. I. 1879.
{ *Zeitschrift für Ohrenheilkunde*, Vol. I. 1879.

THEOLOGICAL LIFE OF A CALIFORNIA CHILD.

This study is not intended in any sense as an inquiry into a child's religious life and feeling. It is intended simply to show the theological atmosphere in which California children live, and their mental attitude towards this theology at different ages.

In any study of the development of the mind, we must understand the theological, religious, moral, political, social, intellectual and æsthetic atmospheres in which the development takes place, and in any attempt to affect the civilization of our own time through education, we must know what these atmospheres are to-day, so this is a broad study in education; to train any particular child, we must know where he is subjectively and how he is related to his world of ideas, and so this is a study for the practical school man.

The data on which the study is based are:

I. 1,091 compositions written by children from six to twenty years old in the various schools of California on the subjects of heaven and hell. They were simply given the subjects and asked to write compositions in the presence of the teacher without suggestion or comment.

II. Sixteen reminiscences prepared by adults, in which they tried simply to recall and state their early beliefs.

III. Twenty-seven studies on young children made by mothers and teachers through conversations, working along the lines of this syllabus:

God—Where is he? What does he do? Why cannot we see him?

Death—Why do people die? Where do they go?

Heaven—Where is it? Who goes there? What do people do there? What will children have there?

Hell—What must a person do to go there? What is it like?

Angels—What do they do?

Ghosts—Why are people afraid of them?

Witches—What can they do?

Prayer—Why do we pray? What do we pray for? Why do we not always get what we pray for?

Religious Ceremonies—Why do we celebrate Christmas? Why do we go to church?

Every variety of faith was represented in the papers,—Catholics, Methodists, Presbyterians, Universalists, Christian Scientists, Mormons, Baptists, Adventists, Spiritualists.

With only two or three exceptions, the children treated the question seriously, and the papers bear evidence of honest effort to express real beliefs.

The data were collated in the following groups, suggested by a study of the papers: God, his appearance and activities; angels, their appearance and activities; the devil, his appearance and activities; heaven, its location, its inhabitants, and their appearance and activities; indications of a critical attitude; acts which

take people to heaven; acts which keep them out of heaven. Since the children were not answering any set questions, we cannot state what proportion accepted any particular idea, but only how many of the children who mentioned an idea accepted or rejected it.

In studying the data, an attempt was made to bring together the theological conceptions expressed in the compositions, and then to determine the attitude of the children toward these conceptions.

The central figure in the theology is naturally God. The pictures drawn of him are often misty and indistinct, but more than half the papers represent him as a great and good man. He is so large that "He could stand with his feet upon the ground and touch the clouds with his arms upraised." He is "a man that has six hands and feet and eyes;" or, "He is a huge being with numerous limbs spread all over the sky."

He is generally an old man with a long white beard and flowing white garments; often he is represented as having wings, and a crown on his head. He is most often described as good and kind; the stern quality is seldom apparent, but the whole figure is shadowy, unreal and indistinct.

A considerable number of children speak of him as able to do anything, as being everywhere, and as knowing everything. Omnipresence seems hard for the children to conceive, and this probably accounts for his being represented with several heads and members. A girl of eleven says: "He can even go through a key-hole, or make himself as small as a pen."

Omniscience is easier; "God can see everything you do and everything you say, even if you are inside a house." "I have thought, and been told that He can see through anything; it makes no difference if it is iron, steel, glass, wood or anything." Many of the children feel that God is watching them, and some say: "He writes it all down." A boy of thirteen adds: "I thought when I was small that if I was not good, God would drop something on me and kill me."

Omnipotence is mentioned by many children, but there are few concrete instances given; one girl of twelve says that "God could have an earthquake at any time." His activities are seldom described; less than five per cent. of the children speak of him as ruling the universe, making things grow, or caring for our material needs. One boy of ten says in perfect earnestness that "God is bossing the world." But the management of the practical things of the world is generally left to the angels.

Christ is seldom mentioned, and His relation to the Father is rarely thought out; where it is, in one-fourth of the cases, the relation is reversed, and God is spoken of as the Son of Christ. The trinity is mentioned by only two children. Christ is mentioned as our Redeemer by some twenty-five children.

Heaven is generally, even with children up to the age of twelve and beyond, simply an improved earth. A girl of twelve furnishes the following typical description: "Heaven is a beautiful city high above the clouds, where everything is beautiful; I think that heaven must be perfect. The gates are pearls, and the walls are formed of jewels, and a beautiful, calm river, clear as crystal, flows through it, before the throne of the King of heaven. Our friends who have died and gone to live there, now serve God, play harps and sing praises to their Maker. The children sing songs of praise also, and serve Him."

More than five hundred children locate heaven in the sky, in the clouds or up. The next most common location is "where the good go," or "where God is," while a few say it is "on the earth," "all

about us," "on some star," or "in the east," "and no one in a balloon could reach it, it is so far away." More arguments are produced to prove the location of heaven, than to prove any other one point. Christ, they say, ascended. Elijah went up, and several close the argument by saying: "Besides, where else could it be?"

Among those who are in heaven, are generally mentioned angels, then God, then the redeemed, and Christ; a few mention dead relatives, the saints, Santa Claus and unborn babies.

Heaven is most commonly described as "a beautiful place," but large numbers describe it as a city, a mansion, a palace, a fine house, a garden or a park. It has streets and gates, plants, flowers, birds and trees. The concrete particular most commonly mentioned is gold. The streets are of gold, the walks are of gold, the houses are of gold, and one boy has the angels eat gold bread. Several say there is no night; and opinion is about equally divided as to whether there are animals in heaven.

The redeemed and the angels are generally the same; over five hundred children mention their having wings; nearly the same number speak of them as looking like people dressed in white; a considerable number say they are women, because they never heard of any men being angels, while a few say they are fairies, birds, ghosts, or little babies. Several think of them as always small, others as having "just baby's heads and wings."

The appearance is sometimes carefully described, as when a girl of thirteen says: "I think they wear white gowns, shirred around the neck." And she adds: "I should think the boys and girls would wear their hair alike." Another says: "I thought angels were all the same size, that even if before they died they were fat, they grew thin."

The activities of the redeemed, or the angels, furnish the most difficult detail in the children's theology. Several say that they do not know what the angels do; but most of the papers represent them as flying around, playing on harps and singing praises to God. Sometimes they are said to help God, and a very few have them help the people on earth. Children of twelve or thirteen often mention the monotony of the life. Thus a boy of fourteen, after describing heaven as a place of singing and praise, concludes: "I suppose they will get tired of living this way all the time anyway I would if I ever went there. I would like to visit heaven for a short time." Another, a boy of ten, says: "Angels do not sit down all the time; they fly around some of the time, and they sit down some of the time." Still another boy adds: "The children which go to heaven sit around and fly around till they get to be grown. I don't know whether they go to school there or not, but I think they do, because they are so patient and good."

Many papers describe the people as praying, praising God and walking about, and one paper puts it: "They appeared to be gathered in groups conversing, much as people do after church service is over, when there is another to follow." To many heaven is an extended church service. Several mention the angels carrying the souls of the dead to heaven, and bringing babies to the earth.

Some of the children declare that the angels work, while an equal number say no one works in heaven. To some of the children, this freedom from work is a chief attraction. A boy of fourteen remarks: "I suppose if I went there, I would not have to take care of baby, chop wood or go to school." A girl of thirteen gets over the work problem by declaring that children in heaven get wisdom without going to school, "and they are very wise."

To the little children, and to some older ones, heaven is a place where you do nothing, have everything you want to eat, and to play with, and are always perfectly happy. It is a park where one goes to hold a picnic. It is a reservoir of good things. As one boy says: "I wish God would send me some of the playthings of the little angels that are dead."

One cannot help wondering whether these two types of heaven are not drawn from the Sundays the children have known. The one somewhat severe and restrained, and the other a free day in the open country side.

The evil spirit and his abode are pictured far less often, and with less detail than the abode of the blest, but there is much greater uniformity in the description.

The general type of devil is well described by a boy, who says: "I thought the devil had a man's head with a long hooked nose and pointed chin, with an ox's ears and horns. He had a man's body, and one leg like a man and the other like an ox. He had a tail with a ball of three points at the end. He carried a spear with three prongs the same as his tail. He could spit fire and had a tongue like a snake." Often he is black, sometimes red. Three or four speak of him as a fallen angel, a few as a serpent or monster. His activities are tempting and fooling people, and killing and burning people. Some say he bites, scares people, or carries off children. Generally, however, the children do not go into any detail about him, but simply say he is a bad man who tempts people.

Hell is located under the earth, or below us. One puts it below China, and one in heaven. It is a place of fire, some say like a furnace, and a very few add snakes and darkness; but hell and the devil play a small part in the compositions, and disappear almost entirely from the compositions written by children over ten years old.

In all this scheme of theology, natural phenomena play but a small part. The stars and moon are a very few times spoken of as lighting heaven. In two or three cases the clouds support or hide heaven. Two or three speak of God as like a cloud, and one says the devil is like smoke; but there is little connection in the compositions between the celestial hierarchy and the mountains and hills, the plains and woods, the deserts and oceans of this world. Thunder and lightning, and birth and death are hardly mentioned in these connections. God is certainly not seen in his works by our ordinary school children.

To summarize briefly the theological ideas of California children we should say: The world of spirits is for the most part attractive; there is very little dark and forbidding imagery; terror is unknown; the ideas are generally vague; and the standard theological beliefs are often quoted in ways that show that the children have had little or no teaching.

What attitude children of different ages take towards this theology is a question of great importance to the educator.

The young children under six, examined by mothers and teachers, accept what they have been told without question or comment. They, however, recast their theology into forms that appeal to their experiences and their modes of thought. The spirit world is simply a beautiful play-ground, where children have what they want; God is a more serious form of papa; the angels are playfellows; and Satan is simply a "boogie," while hell is a dark closet.

From seven to ten there are occasional vague questionings, but under ten years old there are few indications of a questioning or doubting frame of mind. From that time on, however, questions

arise; the children try to reason things out and to relate their theology to what they have learned through experience and through their studies. This critical spirit seems to culminate at thirteen or fourteen; and the criticisms are far more persistent and severe at this time than later. Of course, in this work, as in all studies on children, one must recognize the fact that some children develop much more rapidly than others, so that there are many exceptions, but there is a clearly marked difference between the compositions of children of eleven and of thirteen which must strike even the most careless observer. One sees this difference even when the children are doing the same grade of school work.

Forty papers were selected from one thousand to illustrate the critical attitude. Ninety per cent. of them were written by children from twelve to fourteen years old.

The critical spirit first appears in an effort to place the responsibility for the doctrines stated in the compositions. Thus at eleven and twelve there begin to appear in the compositions such phrases as: "I think," "I've been told," "My idea was," "The Bible says," "I was taught in Sunday school," or "They say." By thirteen or fourteen these phrases become: "We imagine," "I used to believe," "I doubt," etc.

A girl of thirteen modifies her statements as follows: "We cannot exactly tell who is in heaven, but it is supposed that everyone that serves Him probably goes there." And a girl of twelve thus tries to place the responsibility for the statements she offers: "*If* heaven is a place where you *are said* to be always happy, *I think* it must be very beautiful. One of the most lovely things to beautify a place is flowers. And *it is my opinion* that we shall find lovely flowers there. *It is said* that the people that go there, who are angels, have wings and dress in white. Of course, *I have never seen them.* So *I do not know* exactly how they do look."

The most common form of criticism is that which appears in efforts to harmonize theology with experience. Thus one boy says: "I used to believe that the air was full of bad spirits which would hurt you, but I don't believe it now, because they don't hurt." A girl of fifteen says: "I don't see how people can stay in heaven forever without nothing to do except to pray and sing, but people might be different there from what they are here. Here they have thoughts besides those of God and heaven, and I don't suppose they do there. That is another thing about their enjoyment, they don't have the worldly things to worry about, they don't have any ambitious wants or any of the things the people on the earth do."

The mere desire to exercise the critical judgment seems at times the only reason one can find for the questions raised. Thus a boy of fourteen says: "I thought that the devil and all these other things were just as it says they are in the Bible, from which I got my impressions, but beyond that all is a mystery. My idea of heaven has changed, and now I think that heaven is space, but if that is so, how could the heavens open as it says they did in the Bible?" And a boy of fourteen says: "I think it is strange that when one dies his soul goes to heaven if he is good, and if he is bad his soul does not go to heaven, and I don't see what good it does your soul to get to heaven, because you are dead, and you know nothing of it."

The children at this age also try to make their theology harmonize with their humanitarian feelings and their sense of justice. One boy of fourteen says: "I think when a mother sees her son (if such things happen) left among the bad, she will not be very happy for a while." Frequently the children of this age say that

they do not believe that savages and babies will go to hell, while very many who accept the standard theology for God, the angels and heaven, declare that they do not believe that there is any devil in hell. This, of course, may be due simply to their teaching, but such sentiments seldom appear in compositions by children under eleven or twelve years old.

A very few children assert their disbelief in any form of theology; but these few atheistic statements are more dogmatic than the statements of orthodox Sunday school children, and bear all the marks of having been simply accepted from parents or others. For example, a girl of eleven writes, "Heaven is our dear mother and father, and heaven don't help to grow, nor he don't give us bread or anything;" and again, "When people die, they put them in a hole and put some ground on them and leave them there, and they don't go up in heaven or any place, they always stay in that same place."

After children pass fifteen, they generally avoid telling what they believe by saying: "I used to believe," or "when I was little, I believed." If they express their present beliefs, they raise very few concrete doubts. They use more abstract terms, describing God as a great, all-powerful spirit and heaven as a beautiful abode of the blest; angels are celestial spirits and the devil is the great evil influence in the world.

One cannot help feeling that they have accepted an abstraction and a name, and have temporarily, at least, laid the questions that perplexed them aside. Certainly from fifteen to eighteen, there is no such persistent exercise of the critical judgment in matters theological as there is between twelve and fifteen.

In all these reasoning processes, the Bible is only occasionally referred to as an authority, and in citing it, the children show a very great ignorance of the most common Biblical allusions.

Incidentally this study throws a strong side light on what children are taught to consider good and bad acts. Naturally most of the children say that to go to heaven we must be good, and that if we are not good, we do not go to heaven; but in many cases, they specify virtues and vices supposed to be especially prominent.

Next to being good, the virtue most commonly named is obeying God, and then come in order of importance: "Keeping the Commandments," "believing in God," "loving God," "praying," "trusting God," "obeying God," and "telling truth." Less than one per cent. of the children mention "going to church and Sunday school," "reading the Bible," "keeping Sunday," "working hard," and "being baptized."

A boy of four says: "You must be good on the earth and be quiet." While a boy of ten sums up the virtues with: "God wants you to obey your parents and to do what they say, and he wants you to be polite to everybody you meet on the street." The whole career of the good man is summed up as follows by a boy of twelve: "The good man will first join the church on probation, and then in six months he will join the church and be a member. He will push the work of God along as much as he can, help the poor and the church, and probably be successful in business. He will die a happy man and go to heaven."

Among the bad qualities, next to simply being bad, the children mention "disobeying God." Very few concrete sins are mentioned; less than one in a hundred mention "swearing," "lying," "talking dirty talk," "drinking," and "using tobacco."

A boy of twelve says: "God takes people to heaven who don't drink eny likers of eny kind, or choe tobackgo or smok tobackgo;"

and the boy who summed up the good man's life does the same for the bad man: "The bad man commences smoking cigars, and then drinking and gamboling until all his money is gone. He will try to get money from his father, but he will give him a little and tell him not to come back any more. He goes away and spends all of it and lives half starved until he died. This man will go to hell."

Many allusions throw light on the sources of the theological ideas which the children hold. Many say: "My mother has told me," "I have heard in Sunday school," or "I have heard in church;" not one mentions what his teacher has told him. Evidently the effort to secularize our schools has been but too successful. One boy says he got his ideas of the devil from a Punch and Judy show, two say their ideas of the devil came from the pictures on deviled ham, several mention the hired girl as authority, and a large number say their ideas came from pictures.

From this study of the data in hand, it would seem that we could safely draw the following conclusions:

If young children are to be taught a theology, it must have an anthropomorphic and realistic form. We may teach that God is a spirit, but the child's mind at once invests him with a human form and human attributes. If we do not furnish exalted and worthy imagery, the child fills out the form with random pictures, Punch and Judy impressions, and images from grocery labels.

Since pictures furnish so much of this imagery, children should be surrounded with worthy pictures, such as Raphael's Sistine Madonna.

Through confidential conversations with the child, grotesque images should be detected and corrected.

Many California children seem to be ignorant of the most common and most generally accepted theological conceptions of Christian people. They should be given this knowledge, if for no other reason, because it is essential to an intelligent understanding of the literary and artistic life of our times.

The period of the most intense critical activity in theological directions seems to be the period of puberty. Some special effort should be made at that time to assist the child in rearranging and adjusting his philosophical and theological conceptions. In the schools, literary, historical and scientific subjects should be dealt with in a large and philosophic spirit. The child's desire to organize and unify his universe should be encouraged, not discouraged. Later, he will settle down to detailed work.

The general absence of references to nature would seem to indicate that children are accepting our scientific explanations as final. It would seem that the schools should lead them to feel and realize that greater power which lies back of our superficial explanations and makes this a sane universe[1].

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CONSTITUTIONAL BAD SPELLERS.

If a child cannot learn to spell, it is well to locate the difficulty before trying to deal with the case. Knowledge of spelling begins with perception through eye or ear, and ends with the establishment of a chain of memories. Somewhere along this line we may find a defective provision.

[1] Much of the work for this article was done by Miss Ora Boring.

Let anyone watch himself in writing slowly, and he will perceive that the words flow from the pen under the suggestive influence of a series of mental images. He will either hear the words mentally recited, or he will see them mentally in print or writing. Let him write more rapidly, and these images fade to mere suggestions of themselves, yet some clew remains by means of which an automatic series of muscle memories is aroused, and the hand is guided in the correct motion. Knowing that the muscle images are linked to eye or ear images, we trace the maintenance of the sense images to physiological retentiveness, and their origin to the act of perception; while we find the results of this act determined by the way in which attention is directed, and by the conditions of sensation. Thus our line of investigation naturally divides itself as follows:

First, the sensation; second, the directing of attention; third, the retentiveness; fourth, the mental image; fifth, the automatic circuit. Two series of tests are given by the writer, one for eye and one for ear impressions.

These experiments, briefly described at the Round Table of Educational Psychology at Toronto in 1891, are conducted with children from the time that spelling lessons begin. As an aid in the investigation, a special series of tests, more exact and detailed, was given during the past year to five young women over twenty years of age. These students were able and faithful, but were recommended by their teachers of English as incorrigible bad spellers, whose early training and experience seemed to offer no adequate explanation of the difficulty. For comparison, the tests were made upon two good spellers. Reference will be made to only a few experiments, selected from the visual series. The tests for optical defects showed astigmatism in four of the poor spellers, short sight in one, normal vision in one only of the five.

The natural mode of directing the attention was tested by exposing for one second a card containing an unpronounceable combination of letters, those that had been seen being instantly written down in the position and order perceived. The test was repeated with combinations of different lengths. For purposes of comparison, the same test was given to forty other students, who answered an accompanying series of questions. The result showed three distinct modes of directing the attention.

In the first mode, two or three letters only were seen, frequently the first, second and last, the relative location and distance being correctly reproduced. The impression made was that of a whole with characteristic features. In these cases the number was estimated by after calculation.

In the second mode, most of the letters were correctly perceived, the order was right, and in a majority of cases the number was a part of the perception. The impression made was that of a whole composed of distinct parts.

In the third mode, most of the letters were seen, but the order was not known. In one case, the only pure instance of the type, nine correct letters were given in shuffled order, the student declaring that she had received no conscious impression of their arrangement. The number was obtained by counting afterwards. Here, apparently, the impression was of individual, unrelated letters.

Comparison between the character of the perception and the characteristics of the student showed that these three fundamental modes of attention were correlated with three distinguishable and familiar types of mental aptitude and interest. The first favored

the synthetic, the second the analytic, the third the individual and practical. For example, the first class preferred the group of studies including geometry, history, philosophy and the classics; the second, that including algebra, modern languages and the natural sciences. In the third, the choice of studies was less significant than the mental method, which was exact, clean-cut and scrupulous.

The bad spellers of the first type were two students who always sought out the general principle, and remembered by means of it. Conspicuous as thinkers, they were comparatively slow readers, having the habit of reading one word at a time. Almost all their mistakes in spelling occurred in the latter half of the word. For this fact, a slight astigmatism failed to account. Further tests made it clear that attention was habitually directed to the beginning of the word. Here, then, seemed to be one type of constitutional bad speller, proved by subsequent test to have good powers of visualization and sound imaging and fair retention, but gifted with a natural mode of attention unsuited to purposes of spelling.

Of the second mode of attention we will speak later. The third, the individual or disjunctive, furnished no bad spellers. Here a fact was evidently a fact, and the fact that c-a-t spelled cat had been duly observed and pigeon-holed. The ensuing tests served still further to define the mode of directing attention. The best natural speller perceived long words in two or more groups of letters; none of the poor spellers having this habit. Words and irregular geometric figures, variously marked, were exposed, and a list written down of the points of relation observed, within a given number of seconds. The poor speller who observed most points of relation, failed utterly in the tests on visualizing and retention. She could not write fast enough to get the points on paper before they were forgotten. She represented the pure type of the second or organic mode of attention, being able to perceive instantly and correctly a combination of nine letters.

Tests for direct and constructive imaging were given by requiring the student to spell a word backward from the visual image. In the case of those whose attention centered on the first part of the word, only this could be distinctly visualized.

The automatic circuit was tested by having a paragraph written with hand concealed. Mistakes were made of insertion, omission, inversion and substitution.

Comparison of the eye and ear series of tests brought out the fact that one of the poor spellers was an audile.

In conclusion, the following points may be emphasized:

1. Many constitutional bad spellers have defective sight; some defective hearing.
2. The same causes that have operated to impair the sight or the hearing have frequently impaired the retentive power.
3. Constitutional bad spelling may in part be the result of a strong natural bent toward selective attention.
4. In such cases, where the syllable method of teaching might be especially ineffective, the mechanical memory would be helped by assisting attention in its selection. For example, above the word *separate* might be written, as an invitation to the eye, the syllable p-a-r.
5. Apperceptive methods should be employed from the outset in the teaching of spelling.

For the class of students just mentioned they are a necessity; for all they are an economy. The children could use a set of cards, each containing a word so chosen as to furnish material for induc-

tion, in the finding of root, prefix and suffix, and the meaning of each. Then, using these as tracers, they could notice in reading and blackboard exercise such new words as contained the familiar elements. The words separate, preparatory and reparation could form the nucleus of such a group for the use of children old enough to understand their meaning.[1]

6. It might be well to devise some exercises for perfecting the automatic circuit. Possibly practice in writing with hand concealed might be of service, use being made of selections that had been memorized.

ADELAIDE E. WYCKOFF.

The Packer Institute, July 19, 1893.

THE NEW PSYCHOLOGY IN NORMAL SCHOOLS.

My paper is a brief plea for the new psychology in normal schools; first, because it is specially adapted to the class of learners found there; and second, because it insures the sort of child study which is needed now as a basis for scientific pedagogy.

Entrance requirements for normal schools must be low enough to admit candidates from the average district schools. Hence the first year is devoted, not to instruction in the art of teaching, but to the common school branches. Fortunately this work now follows the lines of the new education, so that students begin their professional course with observation and discrimination somewhat cultivated, and an acquaintance with inductive and synthetic methods, but lacking the discipline of the severer studies, and without breadth of view. Could they give the next two years to mathematics, physical science and the culture studies, they would, even then, fall far short of that advancement which is required in colleges before taking up psychology. But this science has its present prominent place in normal courses, because we believe that it furnishes a basis for the theory and practice of teaching. To be used in this way, it must be studied by our pupils at the beginning of their professional work, in spite of their scanty preparation.

The psychology which has usually been taught is abstract and rationalistic. The text-books, even when simplified, present matter which the students cannot relate to their own experience. They are not interested. In too many cases the work has become a painful task of word-memorizing. There is no clear showing of what the study of mind can do for the training of mind. Even of those who do the best, it has been said, they know only the general nature of mind, they cannot deal with the individual. Better results can be obtained by a different sort of work. The new psychology affords the more excellent way, not because it is so easy that anybody can learn it—on the contrary, never before was so difficult and expensive a preparation demanded of the psychological investigator,—but because its methods adapt it to the stage of mental growth of the class of students of whom I speak. "The new psychology," says Ribot, "is not metaphysical; it studies phenomena, and it takes as much as it can from the physical sciences. It studies quality and time relations. It has for its object nervous phenomena, accompanied by consciousness, establishing with care the difference between them. The old psychology is a science of

[1] It is expected that a few of these groups will be prepared for test in the class-room during the coming year.

pure observation, the new psychology has resource to experiment." The new psychology is so new that its results are yet to be found largely in pamphlets and monographs. There is no text-book, at once comprehensive enough, simple enough, and concrete enough for our students. This is, I believe, a good thing, since it insures the inductive presentation of the subject. The teacher must now select and arrange the topics to be considered, and then, through experiment, introspection, and observation of others, lead the pupils to infer the principles for themselves. We need a psychological library, and much use of books by way of reference, but no text-memorizing. For experimental work in sensation, we have Dr. Sanford's admirable course; for the rest, one could be arranged by the teacher. The laboratory work need not involve a large outlay; $150 will go a long way, if wisely expended. Where there is a manual training department in the school, many pieces of apparatus may be made there at small expense. Normal schools need not aim at extending the boundaries of knowledge, and so can do without the costly appliances for quantitative determination. The really serious obstacle to success in experimental work is the large numbers in the classes. These should be so subdivided that the teacher could give each student individual attention. Above all, we must have correlation of allied subjects. Physiology and hygiene must prepare the way for psychology, and for a time must overlap. The teacher of the theory of education, the training teacher, should build on the psychology. The teacher of psychology should be able to turn to the model school for concrete illustrations of principles.

This brings us to our second point. All normal psychology must necessarily be child psychology. Our pupils must be taught to study children. Their lack of interest in this work at first is well described by Mr. Russell of Worcester. He says: "Many students come to us with the narrow view of supplying themselves with a handful of cut-and-dried methods. Their idea of teaching is mostly confined to the presentation of certain prescribed subjects, by a logical arrangement of topics and a process more mechanical than intellectual of 'developing' a few commonplace notions and statements relating thereto. To this is usually added some idea of 'raising the standard' in their schools by various devices, among which 'classifying' and 'averaging' play a prominent part. They have not bestowed a serious thought upon the principle that 'learning depends upon the learner.' Their interest in children is as yet potential and latent. They regard them as material for their art to work upon, and want only such as are good." The first step is to put them into a different attitude toward the children. As soon, then, as pupils enter the school, set them to observing, according to Mr. Russell's plan, which is now so well known that I need not describe it. They will have had a year of this awakening work before they take up psychology. As this science unfolds itself, and they begin to understand degrees of accuracy in observation, the nature of reflection, the importance of measurements, and the use of experiments, it will be more helpful to systematize and specialize in their child study. In a properly related course, the department of physical culture will require from the pupils anthropological measurements of children, records of pulse-beats, with reference to degree of fatigue and excitement, school health statistics, observations on color and other signs of health, movements of children at play, and so on, and psychology can build upon these, in its opening study of the relation of mind and body. The modern view that "man is a creature, whose life is the adjustment of inner to

outer relations, that fundamentally the mental life is for the sake of action," makes it wise to take up next instincts, emotions and will. Experimental psychology does not yet cover this field; it is mainly in the observational stage. As a rule, this side of the child's mental life first attracts our untrained workers, and we may count upon a large mass of observations to begin with. Prof. Barnes has shown us how observation may be specialized here. Motor ability may be studied more exactly by tests. Dr. Scripture has described, in the *Educational Review*, two, which anyone could apply. Dr. Bryan's apparatus cost but two or three dollars, and with that, his interesting line of experiment could be repeated. Children's vocabularies should be sought as well as cases of mirror-writing. In sensation many of the tests used in the laboratory may be at once applied by the students to classes of children, especially in touch, hearing and sight. The pitch-pipe, mounted upon a graduated scale, contrived by Dr. Scripture, will enable them to get accurate results in regard to sensitiveness to variations of pitch. For testing color-blindness, my pupils made disks from Prof. Jastrow's description, and found them most convenient. Results should be expressed as far as possible by the graphic method. For attention, we shall accumulate much data during our work in sensation. Tests on divided attention may be applied, and studies made of parlor games, like the so-called "mind-reading," ouija, and others. In association, Galton's or Jastrow's tests are easily made. A great deal may be done in time experiments with a stop watch, or even with an ordinary watch, if enough tests are made. The analysis of children's associations brings out interesting points. Some experiments should be made to ascertain the relation between association, time and age. In primary memory the children may be tested in their power to repeat figures or nonsense syllables. The latter may be so used as to show whether visual, auditory or motor images predominate. Some of Galton's questions on the image-making power may be asked the children. The entire set should be given to the normal class. Taking as a test their curiously unlike answers to the same questions, the teacher may well point out the great differences in mental life, and the folly of supposing that there is any *one* method of imparting knowledge. The students should collect number-forms and instances of colored-hearing. In memory, many of Ebbinghaus's experiments may be adapted to work with children. As to creative imagination, we are again dependent on observation, as we are also in the important field of childish reasoning.

Such a course as I have indicated will take up all the time now allotted to psychology, but to drop it at this point is to leave all at loose ends, and to fail of a good part of the benefit which we ought to derive from it. We should have, in the last year, a higher course. I fancy it would be better to make it an elective, in which we take a systematic review of the field, discussing topics which could not earlier have been seen in their true bearings. If the apparatus is to be had, let the quantitative enter into experimental work. In many places, students are sent out, in their last year, to practice in the city schools, and thus have a larger field for observation. We may avail ourselves of Prof. Barnes's lines of investigation, or even strike out for ourselves. If normal schools may venture into the work of research, this is proper opening for it. "The fields are white unto the harvest, and the laborers are few."

Will the results from such a course pay for the expenditure of time? I believe that they will. Successful testing and experimenting with children are not easy. The training which the young

workers thus get in patience, sympathy, and insight into childish ways is most valuable. Teachers, thus trained, cannot sink into drudges, nor the work become a tread-mill round; for, as Dr. Hall says: "Though the ground to be gone over each year may remain substantially the same, the children's minds will be seen to be never alike." In their schools, such teachers will be careful gatherers of facts, and thus, each contributing her mite, will help on the day when, through the new psychology, there will be a science of education.

LILLIE A. WILLIAMS.

INFANT STUDY IN THE CLASS ROOM.

In a case where the history of Greek philosophy ran parallel for nearly a year with studies in psychology, it was thought desirable so to correlate the two courses that the development of thought in the race should be traced side by side with that in the individual. As race development takes place on a large scale, and extends over long periods of time, the record is, in one sense, easy for young students to read. The birth of Greek philosophy shows them an infant beginning to make acquaintance with the world about him. As the nursling of Thales and his followers, he finds it a sense-world, a world of water or of air, of hot and cold, moist and dry. With Heraclitus he awakes to its constant motion, and it reveals itself to him as a world of change. Now with Pythagoras he is counting and measuring and weighing, and the world is a world of order and proportion. With Parmenides he probes to find the core of things, of the world and of himself, asking what it is in the knower that knows, and what that is that he knows. So the problem of life grows deeper, and demands a constant increase of resources.

Related to this study of human development "writ large," the observation of unfolding individual life gains in intelligence, while at the same time it contributes in suggestion.

The psychology course opened with a study of the child's first month of life, based upon the observations of Prof. Preyer, and accompanied by reference studies and demonstrations on the brain and the senses. Honest opinions being freely expressed, it soon became evident that Prof. Preyer's infant was regarded as a being *sui generis*, having little in common with the occupants of American cradles. But favoring circumstances made it possible to secure the attendance of a bona fide infant just three weeks old. To the students it was a most significant fact that the child was named James. Upon his arrival, he was surrounded by a dense crowd of spectators, eager to have the text of Prof. Preyer examined at the bar of experiment. It had been conceded that the baby would, in all probability, grimace pleasantly if a glass rod were rubbed between the lips, and unpleasantly if drops of water were sprinkled upon the forehead, yet the actual sight of these phenomena produced a deep mental satisfaction. But the crucial test was successfully met when one eye was opened while the other was shut, and again when one was rolled upward abstractedly, while the other seemed to be gazing at the observer. The child obligingly cried twice, and was twice quieted by the application of a finger-tip in the tube of the ear. Also, he persisted in sleeping most of the time, as if he had had soothing syrup, a fact which was explained, according to Prof. Preyer, by the jolting he had received in the

horse-car. As a result of the class-room work, a committee was organized among the students for systematic infant study. This committee made periodic visits to the Brooklyn Nursery, where there were eighty-three children under three years of age. They also began the preparation of a syllabus for the class study of infants. This syllabus is to furnish a list of simple tests and observations that may be made without exciting the alarm of parent or guardian. Precautions here are especially needful. The curator, who was adroitly negotiating for James's successor, protested to one mother that the child would not be taken from her. She should carry it home at the end of an hour. "But what good would it be, all cut up?" cried the terrified woman.

The work already accomplished on the syllabus has been the selection of all available material from Preyer's "Mind of the Child." To this will be added suggestions from the records of other observers, and tests devised by the students.

Infant observation is not only an invaluable scientific basis for the study of psychology, but an effective agency in developing the human sympathy of the observer. As an influence tending to foster elements of character that are threatened with atrophy in the absorbing pursuit of high scholarly ideals, it suggests a possible solution of one problem of advanced education.

ADELAIDE E. WYCKOFF,
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The Packer Collegiate Institute, July 20, 1893.

A STUDY ON CHILDREN'S DRAWINGS.

So long as a child is perfectly inactive he is useless for purposes of psychological study. We can never get inside of him to study his subjective activity. We must wait for him to come out to us through some of his forms of expression. Drawing is one of these ways in which a child comes out to meet the world; and this study was undertaken in the belief that through a child's drawings we could learn something of the way in which he thinks and feels. Incidentally the study should also throw a good deal of light on the part which drawing plays in a child's life, and on the part which it should play in the school-room.

It seemed desirable in collecting drawings that they should have some common element that would enable us to compare them and reach some large generalizations; accordingly a little poem was selected for illustration. It was taken from Der Struwwelpeter, and was called Hanns Guck-in-die-Luft. The following English translation was used:

STORY OF JOHNNY LOOK-IN-THE-AIR.

As he trudged along to school,
It was always Johnny's rule
To be looking at the sky
And the clouds that floated by;
But what just before him lay,
In his way,
Johnny never thought about;
So that everyone cried out –
"Look at little Johnny there,
Little Johnny Look-in-the-Air."

Running just in Johnny's way,
Came a little dog one day;
Johnny's eyes were still astray
Up on high in the sky;

And he never heard them cry—
"Johnny, mind, the dog is nigh!"
What happens now?
Bump!
Dump!
Down they fell with such a thump,
Dog and Johnny in a lump!
They almost broke their bones
So hard they tumbled on the stones.

Once with head as high as ever,
Johnny walked beside the river.
Johnny watched the swallows trying
Which was cleverest at flying.
Oh! What fun!
Johnny watched the bright, round sun
Going in and coming out;
This was all he thought about.
So he strode on, only think!
To the river's very brink,
Where the bank was high and steep,
And the water very deep;
And the fishes, in a row,
Stared to see him coming so.

One step more! oh! sad to tell!
Headlong in poor Johnny fell.
The three little fishes, in dismay,
Wagg'd their heads and swam away.
There lay Johnny on his face,
With his nice red writing-case;
But, as they were passing by,
Two strong men had heard him cry;
And with sticks, these two strong men
Hook'd poor Johnny out again.
Oh! You should have seen him shiver
When they pull'd him from the river.
He was in a sorry plight,
Dripping wet, and such a fright!
Wet all over, everywhere,
Clothes and arms and face and hair;
Johnny never will forget
What it is to be so wet.
And the fishes, one, two, three,
Are coming back again, you see;
Up they came the moment after,
To enjoy the fun and laughter.
Each popped out his little head,
And to tease poor Johnny, said,
"Silly little Johnny, look,
You have lost your writing-book!"
Look at them laughing, and do you see
His writing-book drifting far to sea?

This story was selected because it was simple, short, contained no difficult objects to draw and contained two distinct catastrophes. Besides this, the story was originally developed by Dr. Hoffmann in his medical practice, as the result of a careful study of children's interests, and so would presumably appeal to the children.

The children were given paper and pencils, and after writing their names and ages, they listened while the teacher read the poem to them. They were then told that they were to draw one or more pictures from the story, and it was read to them once more. There was no conversation, and no other directions were given. The drawing occupied from fifteen minutes to an hour, and when completed the papers were forwarded to me. Papers were sent in from 6393 children, mainly from California, though a few hundred came from the middle and eastern states. Different ages from six to sixteen were about equally represented; and about as many papers came from the country as from the cities; 15,218 distinct scenes were drawn.

These pictures were collated with a view to determining what scenes were most often drawn, at what age the children drew the greatest number of pictures, whether the girls followed the same lines of interest and development as the boys, and whether there was any law governing the drawing of full-faces and profiles.

They were first collated to see what parts of the story appealed most powerfully to the children. There are nine possible scenes that may be drawn from the story: Johnny going to school, approaching the dog, falling over the dog, approaching the river, falling into the river, floating in the river, being rescued, dripping on the bank, going home. Other incidents may be made up. Nearly all who hazarded an opinion on the subject, before the returns were collated, said the children would draw the catastrophe scenes, where Johnny falls over the dog and into the river. But in twenty-four curves which we plotted, representing both sexes from six to seventeen years old, there were always three important scenes that stood out above all the rest, and these were: Approaching the dog, approaching the river, and the rescue scene. The scene most often drawn is Johnny meeting the dog; the rescue scene is almost equal; and approaching the river comes third.

The accompanying table illustrates the same points. The catastrophe scenes are less often drawn than the scenes just preceding them.

TABLE SHOWING HOW MANY CHILDREN, OUT OF 1000 OF EACH AGE, DREW THE DIFFERENT SCENES.

Upper Row, Boys. Lower Row, Girls.

AGES.	6 yrs	7 yrs	8 yrs	9 yrs	10yrs	11yrs	12yrs	13yrs	14yrs	15yrs	16 yrs	over 16yrs
Going to school.	84	118	92	82	172	110	165	165	154	116	172	145
	152	174	156	218	172	174	170	208	185	196	109	132
Meeting dog.	344	360	588	565	585	645	674	669	731	657	702	623
	384	514	425	607	497	577	588	325	672	699	588	558
Falling over dog.	104	154	172	170	230	345	364	406	417	489	496	391
	79	100	134	232	176	244	268	312	329	413	414	367
Approaching river.	214	242	262	272	315	326	350	372	451	394	453	580
	128	177	211	355	262	374	381	410	469	524	414	338
Falling into river.	97	39	92	137	125	145	204	218	150	175	248	188
	24	55	54	109	130	156	141	189	143	201	87	147
Floating in river.	227	220	224	190	215	229	263	187	301	255	270	130
	176	244	179	294	147	197	163	221	269	280	381	235
Being rescued.	344	352	422	390	432	491	534	506	520	518	496	406
	225	366	304	383	302	330	388	400	363	413	392	338
Dripping on bank.	45	66	115	200	177	189	274	294	275	328	313	145
	134	144	92	196	134	169	194	267	182	270	338	323
Going home.	7	4	6	10	25	10	14	5	8	7	21	14
	6	18	6	8	8	36	9	13	3	5	9	12
Added scenes.	143	83	44	60	57	56	36	11	8	7	43	87
	164	111	150	42	96	78	48	20	31	42	21	64

The most obvious explanation of this fact is that the catastrophe scenes are harder to draw than the passive scenes just preceding them; but ease in drawing is not the determining factor, for the rescue scene is the most difficult of all to draw, and yet there is but one other scene more commonly drawn.

Presumably, other things being equal, a child will draw those scenes which most interest him; and if the two scenes which pre-

cede the catastrophes and the rescue scenes most interest the children, then two important inferences follow. In the first place, we can say that children, like well-bred adults, care most in story or drama for that part which leads up to the climax; the balancing of forces and the time of suspended judgment are more attractive than the vulgar blood-curdling detail of the catastrophe or the orthodox — "and after that they all lived happily." This is very important in its bearing on children's literature. In the second place, it would seem that in children the feeling of mercy and helpfulness is much more prominent than the desire to destroy. With children of all ages and both sexes, twice as many drew the rescue scene as the catastrophe; though there was nothing about Johnny that would especially win the sympathy of the children, on the contrary, his general incompetence would prejudice the children against him.

In the second place, the data were collated to show the number of scenes drawn by the children at different ages. At six years old, they drew an average of one and six-tenths scenes. As they grow older, they draw more and more scenes until the girls are thirteen and the boys are fourteen, when they draw a little more than three scenes each; from this time on, they draw fewer scenes until they are seventeen, when they draw only two and four-tenths scenes each. This would seem to indicate that girls at thirteen and boys at fourteen become less daring in expression. The children who declined to draw at all were all over thirteen. Other studies carried on in this line seem to indicate that at thirteen, or the period of puberty, the children experience a change of ideals, and it may be that after this they realize more fully their inability to execute what they see. In any case, this study shows that our children are less daring in expressing themselves by drawing after puberty than before, and this change comes a year later with California boys than with girls.

A third study was made on Johnny as a detail. With a child of two years, he is a mere scrawl, promptly named Johnny. The first part of his anatomy to emerge clearly is his circular head, with eyes and a mouth. Arms and legs sprout forth from his head, and then a line joining the two legs develops a body. With all very young children, the face is drawn full. In our experimental kindergarten, where the children had no instruction in drawing figures, they drew many faces, but no profiles for several months. Gradually the children change to profiles, but in the transition stage many draw a profile outline and fill it in as though it were a full-face outline.

With a view to determining the general law, 12,740 faces were collated from the Johnny pictures drawn by children from six to thirteen years old. At six years, twice as many full-faces were drawn as profiles. From six to thirteen, full-faces decreased and profiles increased, and at thirteen, there were twice as many profiles as full-faces. The number drawn of each was equal at a point between nine and ten years old. This may mean simply that in the early diagrammatic period of drawing, full-faces are easier to draw, while after nine, the child tries to really represent the face, and then profiles are easier. If this is true, it helps us to locate the point in a child's development where he begins to represent things as they really are, instead of diagrammatically, and nine years would seem to be the age at which the grammar of drawing might be introduced. It may also be that before nine, the children have difficulty in recognizing and appreciating the third dimension, and tend to draw everything reduced to a plane surface, but this point is certainly not well settled.

There can be no question that the face is the important part of the figure for young children. Of one hundred and thirty-six children who were asked to draw dogs alone, eighty-seven drew them facing to the child's left. They always began with the head and then drew to the right, so that the hand and pencil would not cover the lines they were drawing.

A general study of the pictures brings out some points which can not be easily expressed in a table or chart.

The one fact that is most strongly emphasized is that pictures are for a young child simply a language. He makes pictures not to exactly imitate something, nor to produce an æsthetic feeling, but to convey an idea. Picture making is picture writing,—and the examination of pictures is for the young child the reading of stories. Many things in these pictures lead to this conclusion. In the first place, not more than ten or twelve papers out of the 6,393 studied are decorated in any way with borders or ornamental lines or fancy flourishes. The houses are simply diagrammatic, the boys are diagrammatic, not one per cent. being clothed. The child goes straight to the point of telling the story. Even when children were asked in another study to draw something pretty, they generally drew stories about some object. In their desire to tell the Johnny story, the children often drew lines to represent the invisible, the air even being represented by scratches. One boy has a line running from Johnny's eye to the clouds; he said he could not make Johnny look up, and the line was to show that he was looking at the clouds. Johnny is often drawn large, as being the important figure in the story. In the rescue scene, two diminutive little men are often hoisting out a perfect giant from the water. But perhaps the most conclusive proof that young children use drawing primarily as a language, is to be found in the fact that they so easily adopt some conventional form and afterward use it quite as a hieroglyphic. Thus in some primary grades, where drawing is used in making number stories, the children repeated the figure in skirts that they had used in number work for Johnny, and also for the two men who rescue him. One child could draw a boy, but not a dog, so he promptly put the boy down on all fours, and with some hair on his back, he became a good dog; others use their kindergarten chickens for dogs. In one of the kindergartens, the children were given some cherry blossoms. Each child drew some symbol looking something like a cherry blossom, and then went on repeating it until the sheet was full. The effort was clearly not primarily to imitate the blossom, but to make something that would stand for the blossom.

This desire to tell the story leads repeatedly to sacrificing the time limitation that so restricts the narrative power of pictorial art. The children will draw Johnny standing on the river bank, falling over the same bank, floating under the same bank, and being pulled back up the same bank by his two rescurs, all in the same picture and presumably at the same time. Limitations that prevent telling the story must give way before the child's desire to get on with the narrative.

In all of these pictures one constantly feels how disintegrated and fragmentary the subjective world of the child is. This leads to many combinations which one might be tempted to explain as lack of reason, or as imperfect seeing; but a careful study will, I believe, convince any one that the fault is due to the fact that the child sees a fragment, a detail, and executes it, then sees another fragment and executes that, and so on, never seizing the whole as a whole. Thus the perspectives show the front of a house and both ends;

often the house seems to be transparent and you see its whole internal anatomy as well. This again brings us back to the fact that with young children drawing is a language. The child wants to tell what he knows about the thing. This same disintegrated thinking is shown in many ways. Heads are drawn in profile and in full-face at the same time. The two men who rescue Johnny stand on opposite sides of the river, each with a hook in Johnny's clothes, pulling him up out of the water. In this case you have simply incomplete thinking; the river is drawn and Johnny floating, a man is put on one side with a pole, and, having been drawn, he fades into the background of consciousness, and another man is drawn at some convenient place, which happens to be the other side of the river. An extreme form of this fragmentary thinking occurs when the child draws some one figure that pleases him and then goes on repeating it over and over again, sometimes making twenty-six Johnnies in a row.

This fragmentary thinking gives a great opportunity for the play of association of ideas. One child drew a sun, which Johnny was looking at; the circle suggested eyes, nose, a mouth and hair, sometimes arms and legs; this completed sun-man suggested a moon and the stars, until the paper was filled with the heavenly bodies. Another child selected the rescue scene to draw; she made Johnny and the two men beside the river; so many men by the river suggested fishing; the rescue faded into the background of consciousness, and she drew first poles in the men's hands, then lines, then fish on the lines. Here she remembered that she could draw a fish, and the rest of the page was filled with an elegant fish.

Very young children when told the story and asked to make some pictures produced mere scratches and scrawls, which they declare to be Johnny, the fishes, the water, etc. Before the child imitates at all, he uses written symbols. Drawing is for the young child a language.

The following conclusions would seem to be borne out by the study on these pictures:

1. Drawing is for the young child a language, a means of expressing ideas.
2. Children naturally adopt symbols and conventional forms to express what they want to say.
3. The courage to express ideas through drawing increases in California children until they are thirteen or fourteen years old and then steadily decreases.
4. The child thinks in small units; his intellectual processes are fragmentary and broken.
5. Children like to draw large distinct figures, expressed with few lines.
6. Children draw full-faces until they are nine years old, and after that, profiles.
7. In drawing figures children are most interested in the head, hence they draw single figures facing their left.
8. A child uses color naturally for decorative effect; for the drawings, he prefers strong black or white.
9. Children select the dramatic points in a story well, and their pictures are naturally full of movement.
10. In a story a child is most attracted by the scene just preceding the catastrophe.
11. The humane instinct in children is far stronger than the destructive instinct.
12. There is very little difference between the drawings made by the boys and those made by the girls. 3,043 boys drew 7,596 pictures

to illustrate the story, while 3,350 girls drew 7,622 pictures, showing that the boys were a little more expressive than the girls. The girls reach their most expressive point at thirteen, while the boys reach that point a year later. The boys emphasized the rescue scene more than the girls did, drawing 1,414 scenes, while the girls drew but 1,193; in the treatment of the other scenes, they were about alike. One could not say that the boys were more daring in their conceptions than the girls were, nor that the girls dwelt more upon details than the boys did.

In the application of such studies as this to education, there are wide differences of opinion. We may say that the natural tendencies in a child's development are right and to be encouraged; or we may hold that the natural promptings of human nature are wrong, and that the aim of education is to divert the human soul from its natural course along some line determined by philosophy or theology. In either case, to act intelligently, we must know what the natural line of development is.

If we believe that this is a sane and well-ordered universe, tending ever toward higher forms, and that consequently all tendencies common to large bodies of children are to be encouraged, holding ever before the child the next step towards which he naturally tends, then in dealing with drawing in our schools, we should follow the child's lead. With young children, then, we should use drawing freely as a means of expression. We should give them a large free surface, and something to mark with that would leave a strong distinct line, and then we should encourage them to work out their picture stories. We should also use drawing freely in all the work of the school, in reading and geography, in elementary science and in history.

The first objection to such work is that the children will make caricatures and burlesques of things, and that these bad forms will destroy their artistic sensibility. In reply, it may be said that in all forms of expression the child must go through the period of the grotesque; we cannot jump him over it, nor carry him around it. In language, spoken or written, it is the same. We do not ask that the child keep silence until he can speak correctly, but he begins with crude mishapen sounds and forms and gradually corrects them. Is not the reason why so few adults ever master any new art the fact that they are afraid and unwilling to pass through the period of the grotesque? Is not the reason why so many American boys and girls give up drawing and singing at twelve or thirteen due to the fact that we hold the ideal so far above realization that they are afraid of the necessarily crude steps that have to be taken? Do we learn except through honest mistakes?

Besides this danger of corrupting the taste, it is held that the child should from the first be mastering the fundamental conceptions of position, direction and distance which underlie all excellence in drawing, and that for this the child needs drill in point and line work. But this, one may reply, is the grammar of drawing. Like the grammar of language, it is useful, but it does not belong to the early period of drawing. For years we have tried to teach children to speak and read by giving them formal grammar. We have failed, but to-day we are reaching wonderful results by leading young children to talk and write, correcting here a sound and there a word, fostering most carefully all the spontaneous effort that we can find in the child. Is it not time to put drawing on the same basis, setting aside its grammar until the child becomes old enough to use it intelligently as a final corrective? This is not saying that a child should not be trained in making exact horizonta

and vertical lines; on the contrary, such exercises have undoubtedly great value in giving the child control over his nervous system, the same value as exercises in sewing and woodworking; but they are manual training, not drawing; and drawing ought not to bear the burden of disagreeable associations which do not belong to it.

When the child has reached a stage of development where he naturally tends to discard merely diagrammatical forms for exact representations, then the grammar of drawing may profitably be begun; and our study would seem to indicate that this is at about ten years of age. Even then, however, the instruction concerning the art should not so far precede the child's accomplishment as to discourage effort. We can so exalt rhetoric as to frighten a boy or girl away from writing; and we can so exalt the rhetoric of drawing as to frighten the child away from drawing.

But even if we accept the natural tendencies of the mind as right and to be encouraged, this study still fails to do more than cast some faint side lights on the many vexed questions which it touches. A score of careful specialized studies must be made before we can speak with the certainty of knowledge[1].

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ART IN EARLY EDUCATION.[2]

BY MRS MARY DANA HICKS.

I believe that there is no word that has more phases of meaning than this word art,—that is, to play so large a part in the discussion of this morning.

To one, it means a bunch of paper flowers; to another, a decorated shovel; to another, wax lilies under a glass cover; to another, one of John's or Mary's wonderful crude works in charcoal (the child knowing nothing of modes of expression, but inspiring the rapt admiration of his parents); to another, a photograph or a colored print; to another, a study of the antique; to another, a transparent water color; to another, a fine engraving; to another, an oil painting, frequently most commonplace; to another, a John Rogers group; to another, a graceful ornament; to another, a beautiful vase; to another, a Corot, a Millet, a Raphael, a Fra Angelico, or a Venus of Melos, a Gothic cathedral or a Greek Parthenon. The objects that are portrayed are different, the appreciation is different, but the impulse is the same in all: a desire to satisfy the æsthetic sense, a desire to satisfy that longing for refinement and beauty which every living soul possesses, and the germs of which remain in every human being, however degraded. It is an unconscious reaching out for something higher, of which dim forecasts are felt within—a striving for the possibilities of enjoyment and creation of the beautiful, which is part of the inheritance of everyone. The realization of this desire and feeling for the beautiful in any degree is art, and the expression of this feeling is a work of art.

The art impulse may not always be strong; it will need nurture and care; it will for a long time need direction, but it always exists; it is a reality, from the beginning of the life of the human soul. It

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[1] Much of the work for this study was done by Miss Anna Köhler.

[2] This paper is supplemented by extracts from one given before the kindergarten department, in which the children's drawings presented by Professor Barnes are considered as showing the art impulses of children.

has to be cultivated, it has to be developed, otherwise its possibilities and even its very existence may remain unknown.

Henry Barnard has wisely said: "The nature of babies and young children is still much less considered by scientific observers than is that of plants and animals; there is consequently in this field an infinite number of discoveries and experiences to be collected together, which, in their importance for the well-being of human society, are second to no science whatever. What Rousseau, Pestalozzi, Jean Paul, Burdach, Schleiermacher, and others have effected in this direction is still very little compared with what has yet to be done in order that education may really bear good fruit, and the secret workings of the child's mind and spirit be fully revealed."

We are beginning now to study the child. The first systematic attempt of that sort was by Preyer; he, however, studied but one child. Now studies of the child are being presented with great earnestness on every side. The very suggestive and valuable paper before the Art and Manual Training Congress by Earl Barnes, professor of education at the Leland Stanford University, is of very great significance. His deductions were very strong and of great interest on the side of mental development, showing to a degree the child's method of thinking and of representing what he thinks. The plotted curves took us up to the child's heights and down to his valleys, so far as the subject, the thoughts presented in the little story would let him go. The story of "Johnny Look-in-the-Air" was a child's story with a moral implied. Strange to say, it was discovered that the children (over 6,000 in number) who drew various scenes from the little story cared more for the quieter scenes than for the rougher ones; greater numbers selected these to draw. Johnnie meeting the dog was more interesting to them than Johnnie tumbling over the dog. Johnnie's going to the river was to them apparently a more delightful subject of thought than Johnnie falling into the river. And still farther, the scene, that called forth feeling of the highest order presented in the story, Johnnie's rescue, attracted them much more than the calamities which befell Johnnie.

These results are especially encouraging to those who believe the better impulses of the child are stronger than those which are debasing. Still farther, the results were encouraging to those who believe in the art impulses of the child. The story selected was not one which would in any way call forth any desire for the beautiful or any impulse to express it. But in the few examples presented, there could be seen a revealing of the inborn æsthetic sense: a revealing of the disposition toward those laws which underlie the highest art.

Professor Barnes said that one noticeable feature was the disposition of the children to present Johnnie as the hero by emphasizing this fact in their own way. Johnnie was made large, while his rescuers were in many cases made small, as if to show that in the minds of the children he was the important person. If this conclusion of Professor Barnes is correct, and there seems to be no reason to doubt its correctness, there is shown right here the recognition by the child of one of the great principles of art, the principle of values—the need that objects should be expressed in some way so as to convey to those who see a picture the relative importance of the objects portrayed,—the need that the principal objects should be so given that its importance will at once be conveyed to the eye, and the accompanying need that subordinate objects should receive subordinate treatment. This is a lesson that the art student has to work long to learn; in the most of cases he has lost that early most unconscious

sense of relations, of emphasis and of proportion (I mean proportion in the large sense of the relation between the principal and the subordinate),—that early sense of relative importance and of relative value.

Another art element found in these drawings is what Prof. Barnes calls the diagrammatic expression. The drawings seemed, however, to be rather more than diagrammatic, for the diagrammatic means coldness and intellectuality, while these drawings have warmth, life, and even color, color being here used in the sense of warmth of tone and expression frequently found in black and white drawings. They have, moreover, an art element which is often sought in vain by art students, a directness and simplicity that uses only telling lines, a strong expression by outline alone.

Professor Barnes said that the drawings did not make clear whether the child apprehended more than two dimensions. The subjects of the scenes were not such as to give much opportunity for showing this apprehension, but the few actual drawings of the children's own work do show in the case of the book floating on the water and of the hat that the third dimension is unconsciously recognized.

The drawings showed another art element,—that of the recognition by the child of the whole rather than of the parts, that which is known technically as seeing the mass. Here the children have especially the advantage over those who have seen more. Life begins to them, as Professor James characterizes it, as a "big blooming confusion." Gradually there appear images in their strong characteristics, and later the details appear one by one; so in the drawings of the children—first, the essential, then the details,—first, the mass, then the parts composing the mass,—first, the outline of the head, then the eyes, nose, and mouth.

Professor Barnes made the very significant statement that in no case in all the drawings was there any attempt at anything like a decoration. There were no borders on the drawings. Here is manifested another recognized art element, namely, that decorative and representative drawings should not be combined, as the purpose is essentially different. Too often we see this law violated, and yet out of the mouths of these babes it is spoken for us. They tell us of oneness of purpose.

Yet for all that, these drawings do reveal to us the decorative instinct for Professor Barnes pointed out that on these drawings there were, especially in the case of the younger children, various little addenda which had nothing whatever to do with the story. He spoke especially of the desire for repetition which frequently manifested itself. In one case, a child drew twenty-six Johnnies. In this is shown that very strong element in decorative art, that of rhythm, which is innate in us all. We breathe in rhythm, and our nature always responds to rhythm, whether in verse, in song, or in decoration.

And still farther, the child seized here the only opportunity presented of manifesting the creative, which is after all the great art element.

These drawings then reveal to us the art elements of values, proportion, simplicity and directness, graphic quality, oneness of purpose, recognition of the whole (seeing the mass), a sense of rhythm, and the greatest of all, creative power.

It is hoped that this experiment may be supplemented by many others. Even with this story, in which there was no reaching toward the ideal, the child has revealed his æsthetic sense, his impulse toward art.

This controverts some of the ideas held in the past. Art has been recognized as the flower of civilization. Works of art are the highest works of man. That which the world would least willingly spare from its life are the master-pieces of art.

"Earth proudly wears the Parthenon
As the best gem upon her zone."

What could compensate for its loss, or for the loss of the Venus of Melos, or the Sistine Madonna? Herein lies the consummate genius of man—the realization of his highest aspirations. Can it be possible that this is also the heritage of the little child,—that in him lie the desires and the possibilities, which, if nurtured, trained and directed, will lead in some degree to the same fruition? It has been deemed an anomaly to say so—it has been deemed wrong to think so. But we are coming to believe that the child is father to the man, and that "heaven lies around us in our infancy." In the little child lies the art impulse of creativity, the creation of the beautiful. But this will not grow, blossom and bear fruit except as the sun shines on it, as the dews and the rain water it, as the soil nourishes it, and as it is tended and trained and guided to its full stature and its highest fruition. In the beginning, it has but the tender life of an infant; it reaches out toward the light, but if it finds only darkness, it hides itself and is lost. What can we do for this divine impulse? How shall we foster it?

First, we must recognize it: we must give it sustenance by presentation of the beautiful. We must let the sun of human encouragement and sympathy shine upon it: we must train it gently by leading wisely to observation: we must teach it the arts of technique: we must bring to its support the cultivation of the imagination: we must lead it to the best expression of the highest thought.

LITERATURE.

Appunti di Statistica Comparata circa gli onorari dei Professori ed altre Spese delle Università in alcuni Stati d'Europa. (IV, 69 pp. gr. 8vo, s. a., s. d.)

This comparative statistical study of the salaries of professors and other expenses in the universities of various European states fairly bristles with figures and is full of useful and interesting information. The countries treated of are Prussia, Bavaria, Saxony and the other states of the German Empire, Austria, France, Great Britain and Ireland, Switzerland, Belgium, Holland, Spain, Russia, Roumania. The consideration of the universities of the German Empire occupies the first thirty-one pages, these being dealt with in detail. From the mass of data in the pamphlet the following items are here culled :

In the Prussian universities in the year 1893-4 there were 573 ordinary professors (philosophic faculty, 307), 324 extraordinary professors (philosophic faculty, 173), and in the year 1892-3 384 privat-dozenten (philosophic faculty, 207). The corresponding numbers in 1859-60 were 364 (172 in the philosophic faculty), 147 (81 in the philosophic faculty) and 216 (107 in the philosophic faculty), so that in the interval between 1859-60 and 1893-4, the faculties of the Prussian universities have increased their membership sixty-six per cent. During the period from 1859-63 to 1884-8, the average number of students in each quinquennium rose from 6,508 to 13,495. In 1859-60 the number of students to every instructor was 8.29 (for each ordinary professor, 16.48); in 1889-90 the corresponding figures were 11.83 and 25.02. In 1869 the number of students in all the universities of the German Empire was 17,631 and the population 40,492,000, making one student for every 2,297 inhabitants; in 1888 there were 34,118 students in a total population of 48,056,000, making one student for every 1,409 inhabitants. These figures, however, include technical high schools, forestal and mining academies, higher agrarian and veterinary schools, but the increase is nevertheless remarkable; it is a growth of ninety-three and one-half per cent.

In 1868 the total income of the Prussian universities was 3,886,633 marks, of which 2,518,818 came from state funds; the corresponding figures for 1893-4 are 10,691,887 and 7,460,340 marks. In 1868 the expenses were divided as follows: Academic administration, 220,187 marks; stipends and remuneration of professors and teachers, 1,786,108; institutes, collections, and for divine service in the universities, 1,440,955; for subsidies, bursaries, etc., 143,788; expenses of construction, taxes, etc., 123,886; for economic need and unforeseen expenses, 171,709; in 1893-4 the figures are 430,358; 3,436,315; 5,300,311; 164,847; 411,898; 379,226; and in addition

368,932 for lodgment of instructors and administrative employees. From this it will be seen that the administration expenses have increased in this period ninety-five per cent.; the expenses for salary of the staff, ninety-two per cent.; building expenses, two hundred and thirty-two per cent.; institutes, collections, two hundred and sixty-eight per cent. The average expense per student was in 1868-9, 534, and in 1889-90, 718 marks.

In 1890-1891 the ordinary expenditure of all the German universities is stated to be 19,274,855 marks; at the head of them all stands Berlin with 2,476,786 marks, next Leipzig, with 1,987,468 marks. In Prussia 72.77 per cent. of the expenditures is borne by the state; in the rest of Germany the average is 80.45 per cent.; at Rostock it actually reaches 98.04 per cent.

The extraordinary expenditures of all the German universities in 1890-1 were 4,450,904 marks, of which 4,387,054 came from the state.

The following table shows the minimum and maximum salaries (in marks) of ordinary professors of the philosophic faculty in the Prussian universities for the years 1868, 1893-4 :

University.	1868.		1893-4	
	Minimum.	Maximum.	Minimum.	Maximum.
Berlin.	2,400	6,600	3,300	12,000
Bonn.	1,800	6,600	4,000	10,500
Breslau.	2,100	4,500	1,800	6,600
Göttingen.	2,400	6,300	1,500	9,000
Greifswald.	2,100	4,500	3,600	6,000
Halle.	2,400	5,100	3,200	9,000
Kiel.	3,840	5,100	3,000	6,000
Königsberg.	1,800	4,932	2,700	7,200
Marburg.	2,400	4,200	2,400	6,000

In Bavaria the salaries of ordinary professors in 1893-4 range from 4,200 to 12,000 marks, there being one at the latter figure and twenty at the former, the rest scattering between, but the great majority below 6,000 marks. In the universities of Austria, the salaries in the lay faculties vary, according to length of service, from 1,800 to 3,200 florins. In France the titular professors in Paris are divided into two classes, the first with 15,000 francs, the second with 12,000 francs stipend.

Pages thirty-five to forty-one deal with the universities of Great Britain and Ireland. The professors of Cambridge receive salaries varying from £300 to £1,000; Edinburgh (in medicine) £2,000 to £4,500; Glasgow, £100 to £517; Galway, £159 to £591; St. Andrews, £100 to £600; Aberdeen, £385 to £1,570—but there are fees and other

contingent emoluments in the universities, which sometimes, as in the case of Glasgow, amount to double or even triple the fixed stipend.

The minimum and maximum salaries of the ordinary professors in the universities of Germany, outside of Prussia and Bavaria, are given as follows:

Strassburg, 2,000, 12,000 marks; Heidelberg, 3,000, 10,600; Rostock, 3,500, 5,700; Erlangen, minimum, 4,200, no absolute maximum; Leipzig, 3,600, 12,900; Gressen, 4,000, 6,000; Tübingen, 3,600, 44,000. At Rostock, Erlangen, Leipzig, Giessen, Tubingen, the professors have an accretion from *Collegiengelder*, etc.

In Switzerland, the minimum and maximum salaries of ordinary professors vary as follows:

Bâle, 3,000 to 4,000 francs; Zürich, 3,000 to 6,000 francs; Berne, 2,300 to 5,500 francs; Geneva, 1,000 to 12,000 francs.

In Belgium the professors at Liège and Ghent have a fixed stipend of 7,000 francs, but the government may, in cases of necessity, augment the salaries of professors by from 1,000 to 3,000 francs, provided, however, that such increase does not amount in toto to more than 10,000 francs for each university.

In Spain the professors of the universities of Barcelona and Salamanca receive salaries varying from 3,500 to 10,000 pesetas.

In Russia the salaries are: Helsingfors, 8,000 marks, with an increase in ten years to 10,000 marks; Kiew, 3,000 roubles; St. Petersburg, 3,000 roubles; Warsaw, 1,200 to 3,000 roubles.

At the University of Jassy, in Roumania, the minimum is 5,124 francs, and the maximum, 9,024 francs.

In Holland the minimum and maximum salaries are as follows: Leiden and Groningen, 4,000 to 6,000 florins (the increase being 1,000 florins for each of two quinquenniums of service); Amsterdam, 4,500 to 5,500 florins (a similar increase of 500 florins for two quinquenniums).

[For the purpose of facilitating comparison, the value of the foreign coins referred to in these statistics is here given in U. S. cents: Austrian florins, 33.6; Dutch florins, 40.2; French franc, Spanish peseta, 19.3; German mark, 23.8; Russian rouble, 54.4.]

The pamphlet contains also many useful items relating to the pensions and taxation of university professors, to their selection and appointment, and much information regarding subordinate officers of universities, etc. The following items are résuméd from this portion of the pamphlet:

England, Scotland, Ireland. At Cambridge there are public professors elected by the university (twenty separate colleges) and professors elected by each college, beside the *Regius* professors, who are nominated by the crown. Private-docents need no authorization to teach. At Edinburgh there are only official professors and lecturers. The professors are in general nominated by the "curators" of the university, but sometimes by the government or by patrons. At Glasgow, besides the official professors, there are some professors who lecture on certain subjects and some teaching is done by fellows and bursars. In the faculty of medicine the lectures of private-docents are within certain limits, recognized by the university in the work of preparing for graduation, but these do not teach within the university. At St. Andrews there are neither extraordinary professors nor private-docents. Professors are appointed in part by the state, and in part by the university, or, in the case of two particular chairs, by private patrons. At Aberdeen, nominally a state university, there are recognized only official professors and lecturers. At Galway there are only official

professors, and these are appointed by the government—for the university belongs to the state.

Germany. At Strassburg the ordinary professors are nominated by the emperor, the extraordinary professors by the chancellor of the empire, the promotion from the latter to the former class being left to the discretion of the government. The admission of private-docents is left to the faculty of the university. At Heidelberg the ordinary professors are nominated by the minister of instruction for the grand duchy, and the extraordinary professors by the government upon the recommendation of the respective faculties of the university. There are also private-docents and honorary professors. At Rostock, the professors are recommended by the faculties and appointed by the government, while the private-docents are appointed by the faculty alone. At Erlangen professors and private-docents are proposed by the faculties and the senate and appointed by the government. At Leipzig the professors (ordinary and extraordinary) are appointed by the government upon the recommendation of the respective faculties. Private-docents are proposed by the faculties and confirmed by the government. At Giessen professors (ordinary and extraordinary) are appointed by the *Landsherr*, upon the recommendation of the faculties and the senate, private-docents by the senate at the request of the applicant and the approval of the faculties. At Tübingen the ordinary professors are appointed by the king upon the recommendation of the senate (after consulting the respective faculties). Private-docents are appointed from those who have obtained the doctor's degree, secured the approval of the faculty and the confirmation of the government.

Switzerland. Bâle (Basel) is a university belonging to the canton-city of Bâle and supported by the appropriation fund of 1,400,000 francs. The professors (ordinary and extraordinary) are appointed by the government upon the recommendation of the "curatel" of the university and of the council of instruction (after consultation with the respective faculties). Private-docents are appointed by the "curatel" upon the recommendation of the faculty of the approval of the convocation of all the ordinary professors. At Zürich, a state university, professors are appointed for six years by the governmental council with the approval of the respective faculties, private-docents by the council of instruction on the recommendation (after examination) of the faculty. At Berne, a cantonal university, all the staff are appointed by the state. Up to 1881, the professors were nominated for life, since then for six years. At Geneva, a state university, the appointment of professors (ordinary and extraordinary) is regulated by the law of June 5, 1886. The private-docents are approved by the senate of the university, according to the dictates of the law.

Belgium. At Liège and Ghent professors (ordinary and extraordinary) are appointed by royal decree, fellows and tutors by the government.

Spain. At Barcelona, exclusively a state university, professors are selected either from amongst the doctors of the various faculties after vigorous competition or by competition amongst the professors desirous of promotion. The University of Salamanca, which is subsidized by the state, by the commune, by the provincial deputation, has only official professors, some of whom are appointed by competition or examination, as at Barcelona, and the others obtain promotion according to the scale adopted by the government.

Russia. The universities of Helsingfors, Kiew, St. Petersburg and Warsaw are state universities. At Helsingfors the extraordin-

ary professors are designated upon the presentation of the respective faculty and of the university council, and appointed by the grand chancellor of the university, who also appoints the docents upon recommendation of the faculty. At Kiew the professors are appointed by the ministry or elected upon the recommendation of the ministry by the faculty and the council. Private-docents are nominated by the ministry, or enter upon their duties after their admission by the faculties and confirmation by the "curator." At St. Petersburg professors (ordinary and extraordinary) are appointed by the minister of public instruction, who may consult the university council. Private-docents are appointed by the "curator" in accordance with a vote of the faculty. At Warsaw private-docents are such as after defending in public a dissertation (presented by them), are authorized and confirmed by the "curator" to teach in the university.

In the University of Jassy in *Roumania*, which belongs entirely to the state, the professors are selected by competition from amongst the various candidates offering, by a commission of four professors, selected from the members of the faculties of the University of Bucharest. If the vacancy is in the faculty of Bucharest, the commission is made up of members of the faculty of Jassy.

In *Holland*, at Leiden and Groningen, the professors are appointed by the king, generally from a list prepared by the "curator" of the university after consultation with the various faculties. The king can, however, make appointments outside this list. The lecturers are appointed by the king upon the advice of the "curator" and the private-docents by the minister upon like advice. The University of Amsterdam belongs to the commune and the professors are appointed by the communal council, subject to the approval of the king. The lecturers are appointed by the communal council without the necessity for royal approval. Both classes of appointments are only made after the curators of the university have presented to the communal council a list of candidates and given their opinion and advice. The private-docents are admitted to teach by the municipal council (mayor and aldermen) upon the advice of the curators and the senate of the university.

With regard to pensions the following are the chief facts: At Cambridge and Geneva professors have no right to a pension; at Rostock, however, their stipend is continued until death. At Edinburgh professors retiring from reasons of sickness or disability receive during their life twenty-sixtieths of their entire stipend, after ten years of service, and one-sixtieth more for every year beyond the ten up to thirty years of service. At Glasgow by reason of advanced age or infirmity, professors can retire after ten years of service, upon a pension equal to one-third of their entire stipend; after twenty years the rate is one-half; after thirty years of service, two-thirds (the maximum)—these pensions being paid by the state. At St. Andrews the amount of pension is regulated from time to time by the state, while at Aberdeen the amount of the pension is determined by years of service and the emoluments received during the last five years of tenure of office. There are pensions at Galway, but the character and nature are not exactly stated. In Germany pensions and their determination vary greatly. At Tübingen the age or duration of service at which pensioning may begin is not fixed—it is based upon inability to continue service and upon the request of the person incapacitated. The conditions are the same as apply to the civil service in Würtemberg. At Leipzig the pensions—mostly consisting of the whole stipend—are

settled, from time to time, by the government. At Giessen the amount of stipend and the years of service determine the pension. At Erlangen the following scale obtains: After three years of service, seven-tenths of stipend; after ten years, eight-tenths; after twenty years, nine-tenths; after forty years of service, or when the age of seventy years is attained, the entire stipend. At Heidelberg the pension can begin after five years of service, according to a scale which after forty years of service amounts to four-fifths of the total immatriculate income; such sum, however, must not exceed 4,000 florins (*i. e.*, 6,857 marks). Special exceptions for longer and distinguished service, however, appear to be made. At Strassburg professors can retire and become *emeriti* when they have attained their sixty-fifth year, or when they are deprived by the government of the direction of a scientific institute or a university clinic. In these cases the professor is relieved of lectures and enjoys his rights, except that of the decanate and the augment, which he would receive in salary while in active service. Here the widows and orphans of ordinary and extraordinary professors are pensioned by the university, the former receiving one-fifth of the stipend of the deceased professor, exclusive of the augmentation—not less than 1,200 and not more than 2,000 francs, and each orphan receiving 400 francs. There is also a pension society (initial tax, thirty marks; tri-monthly fee, five marks) for aiding its members and their relatives in case of absolute need only.

At Berne the pension averages 3,000 francs per annum; at Zürich, after 30 years of service, the professors receive a pension of at least one-half of the fixed stipend, and the widows of professors receive annually 400 francs, and for six years after the death of the professor, the entire stipend he received per annum; at Bâle there is no law giving professors a right to a pension, but generally the state provides one; besides this, there is a university fund of 150,000 francs devoted to the pensioning of retired professors and the widows of professors.

In the Belgian universities, Liège and Ghent, professors and others of the teaching staff are retired by reason of grave infirmity, or when they have attained the age of seventy (the authorization of the government, revocable at any time, however, permits any one of the faculty over seventy to continue his services). The professors are entitled to a pension equal to their stipend, when (1) they have given the university thirty years of service, whatever their age may be; (2) when they have reached their 70th year and have given at least ten years of academic service; (3) when they are retired, after years of academic service, by reason of grave and permanent 20 infirmity. There is also a sliding-scale of pension for those incapacitated after between five and twenty years of service.

The professors of the University of Barcelona enjoy pensions upon the same terms and conditions as other public functionaries, time of service being the basis upon which they are reckoned. At Salamanca pensions are reckoned upon the stipend received in the last two years of service and upon the length of service taken together. The scale is as follows: After 20 years of service, two-fifths of the stipend; after 30 years, three-fifths; after 35 years, three-fifths (the maximum).

In Russia the pension-system varies considerably. At Helsingfors, after reaching the age of sixty, professors receive a pension equal to their entire stipend exclusive of the quinquennial augmentations. At Kiew the ordinary professors are pensioned as follows: After 20 years' service, 2,200 roubles; after 25 years, 2,400 roubles; after 30 years a pension equal to the stipend. The corresponding scale

for extraordinary professors is 800, 1,600 and 2,000 roubles. At St. Petersburg the professors, unless authorized by the government to continue, retire after twenty-five years' service on a pension of 2,400 roubles (3,000 roubles if they continue in service five years more, which is the limit). The corresponding pensions for extraordinary professors are 1,800 and 2,000 roubles. At Warsaw, after twenty years of service, the professors and docents of Russian origin are pensioned at the amount of their stipend; those not of Russian origin obtain the same after thirty-five years' service, but if they are compelled from some cause or other to retire after twenty years' service only, they have a right to a pension of but one-fourth of their stipend, and after twenty-five years to one-half, after thirty to three-fourths.

The professors in the Roumanian University of Jassy have a right to be pensioners upon reaching the age of sixty, after serving thirty years.

In Holland, at Leiden and Groningen, the professors are retired at the age of seventy, or before that time on account of sickness, etc. The pension is one-thirty-fifth for every year of service, but must not exceed 3,000 florins. To be entitled to receive this pension professors must pay to the state during the first five years of their tenure of office an annual one-fifth of their stipend. At Amsterdam professors and lecturers are pensioned when (1) they have reached the age of sixty or over and have given forty years of academic service; (2) when they have reached the age of obligatory retirement (*i. e.*, seventy years)—this applies to professors; (3) when incapacitated by physical or intellectual infirmities. The amount of the pension is for every year of service, one-thirty-fifth of the sum received during the last year of service. There is no retention of any portion of the stipend, as at Leiden and Groningen.

This pamphlet is the most recent and exhaustive study of university economics and administration that has appeared.

A. F. CHAMBERLAIN.

Educazione ed Instruzione. Pensieri. GIUSEPPE SERGI. Milano-Roma-Napoli, 1892, VII. 197, pp. 8vo.

These "thoughts," Prof. Sergi hints, might perhaps have better been called "attacks," for the greater part of the book is made up of criticisms and strictures upon Froebelianism, which the author declares to be "the most irrational educational system that could possibly be imposed upon children,"—and that, too, at an age when instruction rational and of use in the exigencies of society and of the individual ought to commence, for in the present age of economic and political struggles, infantile education is of supreme importance as constituting the basis of the active life of every man. Following are the subjects discussed by Prof. Sergi in his usual trenchant style: *The School.* A school is a laboratory where the raw material of humanity, passing through a varied succession of mechanisms, comes out re-made and perfected, adapted to the social life in which the activity of the individual is to be unfolded. Primitive man—for whom these mechanisms and this laboratory were absent—has remained raw material; yet something of a school does exist even there, for the father instructs his boy in the use of the bow and the spear, but all the rest is left to individual experience and adaptation. In modern society, the school, however, is of the very greatest consequence; without its conscious direction, genius is of little use, nay, even dangerous; without it the extension and development of commerce are impossible; industry needs its illumination; all the

means and ways of communication — roads, steamships, telegraph— would not exist; the grand and beautiful monuments, the perfection of organized government with its vast and regular machinery, the institutions of war and peace,—all these would be undeveloped without the school. The school is the *mater productiva* of all individual and collective riches, because it organizes the psychic energies and fits them to labor, just as science is the mistress of the world and art the terrestrial adapter. The school extends through science and art, is not stopped by the walls of a school room, nor confined to its benches, if it is to become the moulder of the art of life. It is the duty and task of education to bend its energies to the normal direction of human feelings and activity, wherever they may be unfolding themselves in life, to try to suffocate the germs of evil ere they have a chance to develop, to render latent and innocuous the pernicious hereditary tendencies of individual and collective existence, to develop in the easiest and most ample manner the good instincts, those that tend towards the individual and the common good. *The Value and Extension of Education*, *Education of Childhood*, *Child-Education in Italy*, *Infant Schools in Italy*, *Object Lessons in Infant Schools*, *The Suggestive Method in Infantile Education*, *Games and Play in Infantile Education*. The rest of the volume (pp. 53-195) is occupied with "Froebeliana" and kindred subjects: *The Basis of Froebelian Education*, *The Method of Froebel*, *Kindergartens*, *Froebelian Marionettism*, *Scientific Pedogogy*, *Culture in the Life of To-day*, *Philosophy in the Italian Universities*, *Pedagogy in the University*, *Methodic Pedagogy*. Some of Prof. Sergi's striking remarks are these: "Pedagogy is nothing without the sciences which can give the cognitions of human existence—anthropology and psychology; and these two sciences are not sufficient to the pedagogue who would study them merely in the pages of books; it is necessary, it is indispensable, that the pedagogue observe and examine directly—a little, at least—the manifestations of psychic energies in all the conditions of life, in the family and in society, in the first years of man and his gradual development, and also when all these have reached their full growth and vigor" (p. 18). "There are two chief problems in education. The first is to find a method (and to carry it out) which, without altering the natural development of mental activity, will serve to aid it. The other, the solution and application of which is, perhaps, more difficult still, is the direction of the emotional manifestations and the feelings" (p. 34). "It seems to me that this (Froebelian) method, when it is a question of teaching things and of giving ideas of things, is false, because in reality, real things are not presented before the children for them to know, but figures of things; in other words *simulation is substituted for reality*, figures and semblances of things are substituted for real things, natural and artificial, or, in more general terms, the abstract for the concrete. I call simulation those artifices which are wont to be made with the hands and with objects to represent natural things, *e. g.*, animals, or artificial things, *e. g.*, a temple, a house, etc., by means of sticks and bits of wood combined, when the children ought to be shown the real things, in order that they may begin to have exact ideas of these" (p. 38). "Suggestion in education has its limits. At an age when mental activity is in process of development, certain procedures may have grave and dangerous results—the brain, continually waiting for new suggestion after the first, may be arrested and remain in habitual inertia; a narrow and restricted limit of cerebral activity may be created; a species of mental parasitism may arise; too clear a road and too easy a passage may be traced out for mental activity, which will

naturally result in diminishing the individual mental variations which are the best advantage possible for the development of the mind and for the evolution of its products; just as in the case of the muscles, the cerebral functions, accustomed to be guided step by step, will cease to be prompt and quick, and in children there will be established real inertia, the result of hindering proper functional development. The Froebelian method is weighed down with these defects, for, while seemingly desiring to allow liberty and independence of mental activity in children, in reality it suppresses them" (pp. 44-47). "In the use of plays and games suggested or made by the instructors and of which the children are merely the automatic executors, the same method of suggestion continues, which ruins the natural development of the children, tends to equalize them all and to abolish all initiative and individuality" (p. 52). "Throughout Froebelianism there is the *symbol* which destroys methodical and natural development" (p. 63). "Instead of its being said 'that the activity of children is manifested in plays,' as Froebel declared, we ought to say, rather, that 'marionettism and refined automatism destroy the spontaneous activity of the children'" (p. 103). Pages 121-131 are taken up with the discussion of anthropological measurements in the schools, and a "carta biografica" is given after the style of Galton. In treating of culture in the life of to-day Prof. Sergi speaks thus of scientific and classical culture: "Science not only brings culture, but also practical utility; it is the interpretation of natural phenomena, and so enlarges the field of mental activity, enlarges it in proportion to the extent and immensity of nature in the manifestations with respect to human subjectivities. Classical culture revolves in the domain of mind alone; only accidentally does it leave man; but scientific culture carries him abroad into the immense life of nature" (p. 139). "Science has another utility, which seems to be constantly ignored by modern humanists—*its educative effect*. Science offers real and definite cognitions, enriches the mind with facts and ideas, and then habituates to observation, removes the vague and indefinite, purges away false and ill-conceived ideas, directs to the rectitude of reason, lays down bases and facts, and leads to conclusions which are come at directly; hence it establishes normal ways for mental activities, brings lucidity and precision in conceptions, creates the practical sense of life, which is the great necessity of our modern existence" (p. 140). The state of philosophy in the Italian university is very bad. The few students in letters and philosophy who attend lectures learn *nothing*, so Professor Sergi makes bold to state. "The faculty of philosophy ought to be abolished as useless—the philosopher of the future in the university must be sought where he may be found—a naturalist, a physician, a mathematician, an astronomer and not amongst those who write four miserable essays on conscience and the soul, unless we wish to have the ridiculous spectacle of reading works of certain philosophers of our universities, disseminating the most elementary mistakes and blunders of physiology and anatomy, or of physics and chemistry, for the committing of which the pupils in the technical schools would be reproved" (p. 186). Since that pedagogy is not a science, but "the practical application of principle and of norms gained from anthropological and psychological observations," the pedagogue of the university, of the higher schools, "ought to be acquainted with anatomy and physiology, not merely as sciences, the one morphological, the other functional, of one period of human life, but of all the periods of development, from birth to the adult state; he ought to know the chief variations

in the different ethnic elements of the population; ought to know perfectly psychology in the same phases, from birth to the adult state, and infantile hygiene; and he ought also to be able to examine experimentally the organs and functions of the senses" (p. 188). Naturally enough, Professor Sergi desires a new pedagogical régime in the universities. Altogether, his book is of great interest and value to those concerned with the history and development of modern education.

A. F. CHAMBERLAIN.

Missione Educatrice dell' Università. N. FORNELLI. Roma, 1893, 48 pp. 8vo.

This pamphlet embodies the introductory lecture to the course on pedagogy (1892-3) delivered by Professor Fornelli of the University of Naples. His subject is "The Educative Mission of the University"—the university as the educator of the nation. In ancient times higher education was of a popular character. Socrates was in fact a university, as were others before him. Science was making an heroic effort to become the conscience of the multitude. Then came the founding of Alexandria, the Ptolemies with their patronage of arts and letters, and that wonderful library that Omar so ruthlessly destroyed. Here were laid some of the foundation stones upon which was afterwards reared the edifice of Christianity. In the second period of the middle ages divers centres of study were instituted in the pure spirit of orthodox Catholicism—their aim was to reconcile Aristotle and the gospel, just as in the first period of this epoch there had been a tendency, under the still surviving influence of Alexandrian mysticism, to find the gospel in Plato and the Neo-Platonists rather than in Aristotle. To popularize Aristotelian philosophy in the service of theology was the task of the University of Paris, and to this it owed its greatness; the scholasticism of the second period—the scholasticism of Albertus Magnus and St. Thomas—was due to the work of Aristotelian elaboration and popularization of theology carried on especially by the same institution. In the meantime the magic word which was to shake the authority of the church and the unity of beliefs had been spoken. The immense popularity of the teachings of Abelard was due to the scientific instinct of the inalienable rights of human reason. Once set going in men's minds, the movement could not be stopped. Arnold of Brescia applied the dialectics of his master to distinguish and emancipate the temporal from the spiritual, as the latter had tried to separate reason from faith, philosophy from theology. Heresies, heretofore timid and hidden, now lifted up their heads boldly in the name of liberty of thought. The tyranny of Aristotelianism was broken and an increased impetus was given to the diffusion of Platonism by the invention of the art of printing. At that time the greatest Italian universities were the Palace of the Medici and the Florentine Academy. Thence was diffused through the other centres of study the redeeming action of the revolution, which was philosophical and then artistic in Italy, and philosophical and religious in Germany. The Florence of the Protestants was the city of Wittenberg, whose university, hardly yet established, assumed the task of spreading the sentiment for the spiritual redemption of Germany by means of the teaching of the pure gospel in connection with Plato. The movement against the past became so strong as to force the Aristotelians out of the scholastics. For almost a century and a half, the University of Padua became the national seat of Aristotelian teaching and welomed the strong est minds of the time, whether they were Aver-

rhoists or Alexandrists. Sometimes the mission of popularizing science, instead of being simply scientific or historical, assumes the more determinate aspect of a particular national destiny. Thus the teaching of the various philosophic schools of Alexandria, the foundation of the University of Paris, the judicial propaganda of the Universities of Bologna and Naples, the Medicean restoration of Platonism, the evangelical Platonism of the University of Wittenberg and the rejuvenated Aristotelianism of the University of Padua, are direct teachings more or less unconsciously in the way of preparation for those great historical events we call Christianity, papal supremacy, revival of imperial rights, pagan renaissance, Reformation and scientific naturalism. This sentiment of a special national mission became stronger after the Reformation and inspired powerfully the teaching of the German universities. This race-consciousness of a national ideal is still present and German science is patriotic and oriented from national standpoints. The nation has really been educated by the university. Professor Fornelli then discusses at some length higher education in England, dealing chiefly with the university extension movement. His opinion of Oxford and Cambridge before the inauguration of the extension work can be seen from a sentence or two: "The scholars of Oxford and Cambridge valued only Aristotle and Plato, believed in no other humanity and in no other art than classic humanity and Greek art, and despised the national language and literature, as well as modern history and the physical and natural sciences." In France higher education needs a new ensouling and the universities a national regeneration. In Italy the spiritual energy of the people has not been equal to the great revolution—first political, then moral—which took hold of it, nor has the Italian university reflected this moral revolution in its full strength. The destiny of the Italian universities, according to Professor Fornelli, is: "To fill the national conscience now empty, to touch a flame which has not yet burned, to diffuse general scientific culture, initiate the ruling classes, and by degrees the multitude, into the new and mighty revelations which philosophy and science have disclosed to the modern conscience. If, as we have said, every diffusion of higher education is, at bottom, always of a philosophic nature, that which the Italian university was called upon to disseminate, was not merely philosophically educational, but also philosophically restorative of the nation." The English university extension movement seems to point the way for Italy. Popularization of sciences means national education. The true end of the modern university is not to turn out doctors, lawyers and engineers—this may be the work of other particular institutions—it finds its proper sphere rather in the education of the nation, in gradually elevating the national mind.

A. F. CHAMBERLAIN.

Per l'Educazione e la Coltura della Donna. SERGI, G. Roma, 1892, 22 pp.

In this pamphlet—a summary of a lecture delivered on January 21, 1892—Professor Sergi, of the University of Rome, discussed that much debated question—the education of woman. After laying down the following propositions: "Woman, to follow the natural conditions which distinguish her from man, ought to preserve her femininity complete, for it has not merely a biological value, as a sexual characteristic, but also a social and individual one. For the ideal of woman for man is perennial and eternal femininity; and in this way her influence over man is immense and omnipotent. The

masculine woman is a deformation of the human ideal and her influence in the life of humanity instead of increasing should diminish," Professor Sergi proceeds to give in outline a physical and psychological analysis of woman, taking up the following points:

1. Physical and physiological characteristics—smaller stature, youthful or even infantile character of cranium and face preserved to adult age, smaller cerebral capacity, smaller number of red corpuscles in the blood, approach to the infantile in the number of arterial pulsations, costal type of respiration (as in children). All of these Professor Sergi regards seemingly as evidences of the inferiority of woman.

2. Sentiments and emotional sensitiveness—woman is less sensitive than man, both as to organic and emotional sensibility; has less cutaneous sensitiveness (both for temperature and touch), less gustative sensitiveness, less auditive and retinal sensibility. These also are marks of inferiority.

3. Sexual sensibility—this is inferior in woman. In sexual love the woman stands far below the man. As to pain, physical and moral, woman shows greater resistance—arguing less sensibility—than man.

It would be easy to demonstrate, says Professor Sergi, that in the intellectual sphere woman is inferior to man. True, some women have been artists—but none has been a Titian or a Wagner; some women have been poets, but the sex has never produced a Goethe or a Shakespeare; woman may have large scientific culture, but no one will ever be a Darwin or an Edison. This inferiority of woman, says our author, instead of being a misfortune, is a blessing to humanity. "If woman had the emotional acuteness of man, it would be a disaster for mankind and for man considered individually." "If woman were equal to man in intellectual power, it would introduce into the social struggle a new and violent competition." Woman's *practical sense*, however, compensates her for her shortcomings in sensibility and intelligence. She is more analytic in her mind, more adapted to know facts and external conditions in the normally exact sphere of her intellectual field. Professor Sergi says: "I would compare woman to a pendulum moving with small isochronous oscillations; the brevity of these oscillations prevents there being any lack of equilibrium in the more common cases, whilst a pendulum with larger excursions can get out of equilibrium quite easily—such a pendulum is man." Freeing woman from the fancies of legends and the frenzies of love, it should be easy to see what is her place in education, the position best adapted to natural conditions and to social utility. The education of woman ought not to be such as to increase her sensibility and thereby disturb the equilibrium and diminish her practical sense. The woman, serene and equilibrated, should leave to man the tempest of emotions. Her education should serve to enlarge the sphere of her womanliness, and to utilize more beneficially for society the practical sense with which she is naturally endowed—such pursuits as would tend, without destroying it, to give somewhat of a concrete content to this practical tendency. Useful to her would be knowledge of social facts and happenings, the constitution of the family, regulation of the state and the like, as well as of such facts of scientific character as might be of use in the household; some biological laws, such as a knowledge of the physico-organic surroundings in which man lives, etc. Then, if she has means and leisure, she can proceed farther and find intellectual food in the results of science—the power that governs the world and creates the progressive movement of civilization; and, then,

she may well turn her attention to the fine arts, which contribute much to the education of the more elevated and more delicate sentiments. But woman's education, no less than man's, ought to have as an ultimate object the formation of character, and woman, if she is to retain her position and continue to exercise her salutary influence, must form her character without leaving the natural conditions in which she finds herself. She must not try to become a man.

A. F. CHAMBERLAIN.

Saggi Pedagogichi con Prefazione del Professore Giovanni Colozza. VECCHIA, PAOLA. Torino, 1893, 231 pp.

Professor Vecchia is one of the promulgators of the "new education" in Italy, and to him is due in great part the introduction of the study of scientific pedagogy into the normal schools of that country. The first part of the volume (pages 15-142) treats of general psychology and pedagogy, embracing essays on: Attention (a condensation of Ribot's *Psychologie de l'Attention*); automatic phenomena in mental association; two principal laws for the education of memory (the extending and strengthening of mental association — the basis of memory—and the registration in the organism of the automatism of memory by means of exercise; physical and psychical conditions for the exercise of memory; abstract studies and sentiment occasioned by reading the *Memoirs* of John Stuart Mill); on a physiological reason in favor of teaching by means of objective observation (the chief part of the energy necessary to generate speech comes from the same cerebral regions that preside over the formation of visual images); on the faculty of counting in children and in some animals; weeping in children (weeping ought to be prevented as far as possible); fear of punishment in boys; school punishments and the nervous sense; the pedagogue, Pietro Giordani (born 1774, died 1848—one of his sayings was: Grammar is a study, not for boys, but for youths); suicide and the schools (based on Professor Corradi's *Suicide in Italy*, published in 1881); gymnastics and mental labor (gymnastics ought to mean mental repose—exercise for the body, rest for the mind); the study of pedagogy for elementary teachers; female education and normal schools (women ought to have the advantages of a normal school education); the pedagogic movement [this article, comprising pages 110-129, is a *résumé* and condensation, with occasional critical remarks, of the articles *Educational Reforms* (editor) and *The New German School* (Dr. W. H. Burnham), which appeared in the first number of the PEDAGOGICAL SEMINARY]; methods and modes of studying and composing. The second part, entitled Didactic and Regulations, treats of the following subjects (pages 143-223): Male or female teachers, which? (women are better suited for elementary schools); between the old and the new (criticism of pedagogy in Italy to-day); on a false phonic method and on the physiological mechanism of speech (criticism of the so-called "phonic," *ma*=me+a method); the common-sense method applied to teaching of reading (the system in which letters and syllables are regarded as so many practical objects to which names are given); the ranking of pupils in their seats (discusses the question whether the pupils should be seated in order of stature or in order of merit). Professor Vecchia does not approve of ranking them by stature alone, nor is he in favor of the Jesuitical "classification by order of merit"—a compromise with weekly changes of position is his solution. Other topics discussed in brief sections are: Reading-books for element-

ary schools; history in elementary schools; history in the third elementary class; defects in the programmes of the secondary schools; examinations for promotion in the secondary schools; holidays and school hours; normal schools and the training of teachers; ethics and pedagogy in the normal schools.

A. F. CHAMBERLAIN.

L'Etat et l'Université. Par ADRIEN DUPUY. Paris, 1890, pp. 288.

In the *Instructions* recently addressed to the masters of secondary schools, M. Dupuy sees indications that the university misconceives her relation to the state, and is tending towards the status of a private corporation, having personal interests. What he attempts first to do is to remind her that she is an integral part of the state, that she is, in fact, the state teaching. Since 1789 the state has been identified with the lay society, whose tendencies and aspirations she shares, and whose friendships and hatreds she embraces, with which, in a word, she forms an indissoluble whole. The history of France is the history of the lay society. Its whole significance lies in her having emancipated herself from the tyranny of privileged monopolies and superstitions. If, then, the government fulfills its duty it must be constantly preoccupied with the interests and needs of the lay society. Yet the university says, in substance, "There are but two kinds of establishments which have classes in philosophy: the houses of the clergy and those of the university. Pupils who do not wish the first are compelled to take the second. This is a reason why the professor should maintain great reserve in the expression of his personal opinions." M. Dupuy sees but one reasonable interpretation of this, namely, in brief, that the philosophy of the university must approach as near as possible the philosophy of the clergy, and that the professor *en rôle* ought to exert himself to think and speak like the professor *en soutane*. "It is necessary to inspire the rising generations with the spirit of tolerance," say the *Instructions*, "for the country, which will belong to them to-morrow, is weakened by political and religious divisions." These words, which seem a commonplace of conversation, are significant when officially pronounced. Is France, unknown to herself, passing through a period of intolerance? Has she turned persecutor? Or is she, perchance, on the road to Damascus, and will she be converted *en masse* to the politico-religious system of M. Vogüé? By her silence on occasions when she should speak, and by her professed neutrality, the university has exposed herself to the charges. As an integral part of the state she should not proclaim herself neutral. She should have a political creed—the creed of the republic—liberty and justice. She must have a religious faith—a belief in reason as the guide of man. She finds herself in the presence of resolute and skillful enemies, under whose lead she would return to privileges, corporations, monopolies. She has need of defenders who are prudent and strong, and have convictions; of advisers whose self-possession never fails, whose sensibilities are not moved by unjustifiable or hypocritical gnawings, and whose reason is invincible to the sophisms of a false liberalism. The nation has established the government of its choice—the republic; it has taken reason for its guide, and the government in all its parts must follow the development of the nation. To the university she has entrusted the training of her youth; to the university she looks for her strong defenders and wise advisers.

Since four-fifths of the population receive no instruction beyond the secondary schools, their importance will not be questioned. They should be so reformed that they will give a complete educa-

tion. M. Dupuy does not join the outcry against them; his criticism, on the contrary, has great merit of being constructive, and he laments that since the introduction of pedagogy, so many writers, and notably so many within the university, have subjected them to adverse criticism until public confidence has been weakened. He defends the *internat*, and the encyclopedic character of the programmes. The most important changes should be the addition of the history of literature, and increased instruction in political history, philosophy and morals. Writers and teachers of history are charged with having given so much attention to the heaping up of details that progress is barred, and all significance lost. From the unwieldy mass that has been accumulated, he would have them select such events as have contributed to the evolution and progress of the nation and present these as related parts of a comprehensible whole. This instruction would include the history of institutions and religious movements when the professor must still keep to facts. What he has to do with parties and dogmas is to point out their relation to the progress of liberty and the triumph of reason. On these points he must hold the view of the republic, see clearly and speak freely. He would do well to use monographs on these special subjects, for the sake both of clearness and variety. A suggestion worthy of attention for giving the teacher of history more time for his department is to ingraft upon the course in geography the history of campaigns and the movements of armies. These are determined by the surface of a country, while history proper is concerned only with the results of wars. The details in the chapters on history extend to the manner in which M. Dupuy would treat a certain epoch, and what he would say of the character and influence of a certain man, and are highly instructive.

What has been said concerning the teaching of history indicates sufficiently, perhaps, the manner and substance of instruction in literary history and philosophy. The emphasis must not be laid upon style, but upon the rise and prevalence of ideas. The professor must be of no school, but must see what ideas have had the value and significance of the universal and the permanent.

E. M. H.

Origin of Right or Left-Handedness. BALDWIN. *Science*, XVI. 1890, 247; *Infants' Movements*, *Science*, XIX. 1892, 15.

The first paper is an experimental endeavor to discover the time and circumstances of the rise of preference for either hand on the part of infants. The method consisted in tying the infant to his chair by a cloth around the body, and then exposing before him colored papers and other bright objects at distances measured upon a graduated scale, which projected horizontally forward on the level of the shoulder. The results are summarized as follows: (1) No preference for either hand earlier than the rise of voluntary muscular efforts of a violent nature, about the seventh month, based on 2,187 cases, which gave 585 right-hand cases, 468 left-hand cases, and 1,034 both-hand cases. The tendency to use both hands together was accordingly double as strong as the tendency to use either separately. (2) A distinct preference for the right hand in violent efforts in the seventh and eighth months. In eighty cases of such effort, 74 were right-hand, 5 left-hand, and 1 both-hand cases. From 86 cases of bright color stimulation in the eighth month, 84 were right-hand cases. (3) Accordingly right- (or left-) handedness develops under pressure of muscular effort before either the walking or the speaking function is acquired. The

author thinks these results afford evidence of a feeling of stronger outward nervous pressure in the right arm centre, which furnishes the "cue" for the use of that arm. Prof. James (who discusses these cases in *Science*, XVI. 1890, 275) holds that the "cue" may be furnished by the sense of greater skill, ease, and security in the right arm, left behind by earlier exercise of this arm. This Prof. Baldwin answers (*Science*, XVI. 1890, 302) by saying that in that case the right arm would be preferred by the infant in all its reactions (other conditions being the same), and not merely in those demanding effort.

Further observations reported in this paper are to the effect that the child spontaneously begins at an early age to adapt its muscular efforts to its visual estimations of distance, refusing "in the seventh month to reach for an object more than 14 inches distant, when the reaching distance was 9 to 10 inches." Further, blue and red proved to be the most attractive colors, as measured by the amount of effort put forth in reaching them.

In the paper on "Infants' Movements," the author finds native walking reflexes in the eighth and ninth months of infancy, and locates the first clear imitations as late as the seventh or eighth month. He considers Preyer's reported cases in the third month as coincidences merely. Vocal imitations are later than hand-movement imitations. He also reports a series of drawings made by his child after "copies" of simple objects regularly from the nineteenth to the twenty-seventh month. He found no apparent connection between the child's mental picture and its movements to "draw" it, up to the end of the second year. In the twenty-seventh month, however, she suddenly began to trace in imitation of the copy. She seemed to get the idea of tracery imitation by breaking up the copy into parts and doing each part separately. The beginning of object drawing, therefore, is found in this tracery imitation of a visual image. In these early drawings, angular straight lines preceded curves, and the arm movement preceded the hand movement. The earliest movements (with the right hand) were from left to right in drawing upwards from the horizontal, and from right to left in drawing downwards, *i. e.*, the curves followed the direction of the hands of a clock.

Pourquoi l'on est droiter? FORTUNÉ MAZEL. *Revue Scientifique*, 1892, I. No. 4, p. 112.

The writer gives a new theory as to the cause of right-handedness. With others, however, he holds that it is hereditary. (1) All prehistoric as well as historic writings show that the use of the right hand has almost exclusively predominated. This speaks strongly for its being hereditary. Again, if right-handedness originated by people acquiring it hereditarily from their ancestors, who had been educated to it, why is it quite impossible to educate those who are born left-handed to be right-handed? And if a person can be born left-handed, why can he not be born right-handed? Moreover, can education through imitation really create right-handedness in one who is equally prone to be left-handed? Against this latter he argues that if a person stand before another and make some kind of an expressive movement with his left hand (*e. g.*), the other will in most cases imitate it with his right, provided he has not anticipated the object of the experiment.

(2) The author's explanation of right-handedness coincides with Gratiolet's and Wilson's study of the predominance of the left half of the brain. This predominance consists in the blood supply as well as in the mass of nervous matter. It is no doubt accompanied

by a functional superiority. The speech centre, and therewith the language centre, being situated on this side of the brain, account for the prevalence of right-handedness. Mazel holds that there are three principal methods of general expression, especially as exhibited by young people: that of speech, that of gesticulatory movement by means of the right upper extremity, and that of mimicry by means of the left side of the face. He gives an account of the growth of the expressive faculty in children. During the first five months no expressive movements are made. At most, the child makes movements of the feet and of the two hands indiscriminatively. At the age of seven months, says Wilson (quoting Baldwin), the predominance of the right upper extremity is fixed. The child now executes right-handed voluntary movements in the proportion of 93 to 100. With the development of ideation arises also the need for its expression, which presupposes a gesticulatory movement of some kind. The child cannot speak, but long before its phonetic organs are in working order, he can give expression to his ideas. For many months, by means of his right arm, he will speak with all the eloquent impetuosity of his age. Afterwards, when phonetic articulation does appear, he will still, perhaps, make use of arm movements in order to keep his power of expression as wide as possible. During many years these will give place to the voice, losing, undoubtedly, their importance in proportion as phonetic ability is developed, but remaining always the necessary and joyful companion of speech. The organs of expression, then, being localized in the anterior part of the left half of the brain, it would be contradictory to find the right brain (and therewith the left arm) the seat of gesticulatory expression by arm movements.

(3) It is probable that right-handedness will become more and more predominant above left-handedness. It would seem that left-handedness might be sufficiently well explained by prehistoric instruments (of every-day use). The book of Judges gives for the tribe of Benjamin a proportion of left-handed people in the ratio of 2.73 to the 100, which is greater than the present. It might be well to study the proportion of left-handedness according to sex, race, state of civilization, etc., in order to determine how far left-handedness is dependent on cerebral development; how far it merely represents an ethical type, a peculiarity destined to be wholly effaced by time. Before investigating the causes which lead to the modification of the cerebral centre of expression, one must ascertain whether the known cases of left hemiplegic aphasia do not concern left-handed people almost exclusively. One might still ask, on considering an opinion, not general at the present time, namely, that in certain cases of aphasia the patients have learned to speak by means of the right brain, whether both sides of the brain were not originally equally necessary as centres of expression. The selection of the left brain might have taken place at an early period, and becoming more and more predominant, left-handedness might only now remain as a representative of a selection prevented by the right brain. A. E. S.

Volks Schulen, Höhere Schulen u. Universitäten. J. BAUMANN. 1893, pp. 144.

The author has been long known as a professor of philosophy and pedagogy at Göttingen, where he was a friend and neighbor of Lotze. He here sums up his educational ideals, which are in many respects quite revolutionary.

Beginning with the universities, he assumes with Bacon that science is the only power man has over nature, and that all practical knowledge of her laws culminates in the arts of health. All knowledge should bear fruit for medicine, the end of which is to make life longer, and especially more effective. The art of living and working is the supreme art. To this end he would have all serve one year in the army, to rest, and to learn simple and healthful living before they enter the university. Once there, they should find a large outdoor square for athletics, should be taught to fight, to dance, to ride, very many technical processes, and should learn to support themselves. After a year or two, they should be admitted to self-governing boarding houses, supported by all the stipends that could be thus fused and applied, and in each of which should live a private docent or coach, lecturer or monitor. The vices of youth are lust and destruction. These should be ameliorated and not aggravated by university life. The "innocent, fantastic ideality" of youth should be developed to this end. Throughout all, it should, then, never be forgotten that the *summum bonum* is health.

Professors are naturally divided into three classes: first, investigators, who should lecture on very special topics only to the most advanced students. Their instruction should be open to all who take degrees, even to those who never expect to do research themselves, that they may know how science grows. Doctor's dissertations, which used to be mere compilations, but are now expected to add to science, must be under these professors if they are to be really contributions to science. The author has but a poor opinion of theses by students for whom all the work is planned and supervised by the professors, and who never do anything after they are removed from their influence. Second come the teaching professors, who love to lecture over an entire but well defined field. These especially develop what Voltaire calls the supreme passion, the ambition for discipleship. Often this is done by unduly disparaging or ignoring others' work, and by an over-emphasis of their own personality and all the arts of academic charlatanism. These professors have great influence, but are forgotten as soon as they die. It would be better if most general courses were given with a printed text-book in the student's hand. Thirdly come the practical teachers, whether of laboratory technique or demonstration, or inspirers of virtue by their lives and precepts.

Each chief topic of university education is taken up in some detail; a redivision of term and vacation is proposed. If students do not like the theory of their specialty, they must study literature, that the imagination die not in them. Youth is a constant drunkenness, caused by the natural tumult of stages of development. Specialization often steadies young men; an outside second interest or a vocation often does it. Yet each should still have a year or two in which to follow courses freely according to his curiosity, before he makes a contract with his future examiners and works towards his calling. Specialization must come, however. Of every man of general learning, as formerly of men of *esprit* or common sense, it may be said: *Il sert à tout, mais il ne suffit à rien.*

The Speech of Monkeys. GARNER. New York, 1892.

Monkeys have vocal means of communication; some of these the author records on the phonograph, some he learns and speaks. In one word which may mean "water," "drink," "thirst," "food," "hunger," "give," or a salutation, is to be found the clew to the great

secret of speech (whatever that may be). Shaking the head means "no;" "e-c-g-k" is a warning against danger; "chi" means the approach of something not dangerous. In the Rhesus dialect, food is "ngu-u-w;" in the Mangaby it is something else. Mr. Garner's "analysis" of sounds, as he calls it, is something quite different from the physical analysis. No apparatus is needed beyond a phonograph; simply reversing the motion of the cylinder reduces vowel sounds to their fundamental state (p. 178). "The application of the phonograph to my special work is really the discovery of a new field of usefulness for that wonderful instrument, which up to this time has held the place of a toy more than that of a scientific apparatus . . . . in the study of acoustics and philology" (p. 176);—the work done on the examination of phonograph impressions and their use for vowel-analysis being, of course, unknown to the author. The analysis of vowel sounds is settled in one sentence: "By aid of the phonograph I have been able to analyze the vowel sounds of human speech, which I find to be compound, and some of them contain as many as three distinct syllables [*sic.*] of unlike sounds." Probably Mr. Garner considers the work of Helmholtz and a host of others as unworthy of notice. His scientific calibre can be seen in his remarks on the physics of sound in pp. 179, 180. Ch. XV., on Man and Ape, might have been written by a school-boy (judged by his English, Mr. Garner never finished the grammar school), who had by chance picked up a volume of Darwin; science (in the person of Mr. Garner), forgiving "Mr." Darwin for a sin of omission, is delicious. Mr. Garner also throws in a lot of cheap talk about being a heretic to science. The book is a piece of scientific quackery, even in the frontispiece of the author and the list of victims on the dedicatory page who have opened their purses to enable him to phonograph the monkeys in Africa. The thorough way in which Mr. Garner has been advertising himself is sure to render the book a great success.

Yale University. E. W. SCRIPTURE.

Froebel. By H. COURTHOPE BOWEN, M. A. New York, 1883, pp. 204.

This book is in the "Great Educator Series" edited by Professor N. M. Butler, and is fully up to the best in this very useful series. The author has been head master of a school, and is now university lecturer on the theory of education in Cambridge, England. He has made a long and careful study of his subject, has used all the authorities, and has given us the best book on Froebel in English. A vivid picture of the earnest and toilsome life of this deep-souled man is first given. Much space is given to his theory, his profoundly religious nature and his creed, which are well compared with those of Wordsworth. His basal word was self-activity. One can be a complete man only if all the requirements of his infancy, boyhood and youth have been faithfully fulfilled. He was almost God-intoxicated. All must be seen as one in God. Everything is a symbol to this pantheistic Christian. Very much he had in common with Herbart Spencer, and he got much from Krause and Schelling. He had too great contempt for instruction. All was to "make the inner outer." To give knowledge that cannot be put to immediate use is an outrage. Human nature is assumed to be mainly good, and no one can teach well who does not believe this ardently. Faults must be given no vent, an idea greatly at variance with Aristotle's catharsis theory. The senses must be awakened as organs of mind and not as organs of mere sensuous pleasure. If the

child does not love nature and parents at first, it cannot worthily love God later. The Lord's prayer should be taught in the language of action. This is deeper and should precede mere memorizing of it. Free play and story are far better than the rigid orthodoxy of the set gifts and occupation, and the best thing about the book is the little space and small regard the author has for these as finalities. We should go further, and say plainly, that they now need radical reconstruction.

Mothers' Songs, Games and Stories. Tr. by FRANCES AND EMILY LORD. London, 1892, pp. 212 and 75.

This is the second translation into English of the unique "mother and cosseting songs" of Froebel, and is not only complete, but all the original illustrations and the music rearranged for children's voices, and with piano accompaniment. Forty-six of the fifty songs are illustrated, and Froebel's explanation of each is given. The cover contains two cuts, a mother crowned with oak to symbolize the difficulty of her work, looking up for divine guidance, with a girl baby nestling to her heart on her left arm, and a boy turning from his mother, to indicate the greater independence of boys, on her right arm, who holds a ball. In the other picture the father leads the girl, now grown to adolescence, by his right arm, to which she confidingly clings, and the boy is led by the left hand. The latter is now bold and presses up the hill of difficulty ahead of his father. We can sample only one song, Pat-a-cake. First is a poem of eight lines from the mother, saying that so simple a game, like all else, may be made to have a deep significance for the child. A ten line song follows for the child on kneeding and moulding the cake, getting it deep into the oven, etc. On the opposite page are both songs in German, a cut showing how the mother is to hold her baby's hands, a full length cut of the mother holding and showing the child, and in the background of the kitchen all the processes of bread making are shown, and in an upper corner children are making cakes of mud. Froebel explains in the back part how the baker, miller, farmer, the rich soil, and God, all co-work harmoniously in bread making; and the moral is, God feeds us from love. Everything about it is deep, sacred, religious, and almost awful. This is the spirit of each of the 49 others. Each is a point of deep contact between the soul of the mother and child, beginning soon after birth, and going on to the age of two or three years. Not only the content and ideal, but the very get-up of this remarkable book illustrate the vast and unsuspected and often discredited utility and range of symbolism and allegory for children. Bunyan and Delsarte are right. Here is a sphere of psychic life which mothers (because they can so deeply enter into their life) know, which is far less open to men. By these faculties Miss Morley did so much to solve the problem of teaching the origin of life in a way both delicate and effective. PED. SEM. II. 2. p. 251, and Hoffmann's wonderful book, II. 2, p. 303, has something of it.

L'Evolution Intellectuelle et Morale de l'Infant. Par G. COMPAYRÉ. Paris, 1893, pp. 371.

This heavy volume, devoted to "the most attractive of the new fields of study opened by modern science," is dedicated to the sons of the author, and with Tracy, Shinn, Preyer, and a volume in preparation by Sully, shows that the psychology of childhood is a field of very rapid expansion. While we feel that the time has not yet come to see the full scope or judge the full value of this new

work, these compends may serve to give a needed comprehensiveness and unity to the field, but we feel like pleading for a suspense of judgment concerning the work. Its future depends, not upon the compilers, but upon the patient and peculiarly hard and long investigations of special topics. Practical applications of the subject are subordinate to the scientific. We do not care so much for dates of abilities, but the sequence of them. In infants spontaneous movements precede consciousness, but in adults this order is reversed. He ends at the age of four, because all parts of the mind are then present. He would not assume an instinct for every act, like Perez, thinks the crying child loves to cry as exercise; that color-perception begins at the red end of the spectrum; that convergence of eye muscles giving the third dimension was "selected" out of all other possible movements as most serviceable. Gluttony is the first passion, and anger and jealousy unfold in connection with it, and few need previous experience. Save in case of darkness and the unknown, children are and should be at first passionate egoists, or else altruism cannot be deep and strong later. Memory, which is later very vivid and literal, is at first weak, because the unifying ideas of self and time and language are wanting. Children take all kinds of liberty with language that makes for economy, and they do invent new words and meanings after making all allowance for corruptness of heard words and the noises of animals. Ideas of justice are early, while remorse is as late as six. Preyer's view, that the self is a collection of sensations, and Luys' "new nominalism," that the consciousness of self comes by teaching the word I = ego, are both wrong; so is Locke's view, that punishment must be inflicted before the child is old enough to remember and so cherish resentment. The child is a book written by two authors, nature and education, while parents must look on and see that neither distorts it. At first the child is like an adult waking from sleep. If there is "organic omniscience," there is no distinction between subject and object, but the self-feeling is strengthened later by will and cause. Children are rather good by nature, their cruelty to animals being unconscious Cartesianism.

Beitrage zur Physiologie der Schreibens. A. MOHR. Dis. Berlin, 1882.

Script measures the degree of sensibility of the different joints. The brain furnishes not only the motor concept, but coördinates. We also see and feel writing, the latter as joint-excursion if the writing is actually done and not repressed. The will and sense of resistance, due chiefly to friction, are also involved. The sensibility of the skin and muscles must be intact. In the atactic stage of tabes, with hyperæsthesia of muscles and joints, increasing pressure and friction are invoked. The amount of resistance must not fall below a certain limit. The innervationists are wrong or we should feel the least motion. The experiments consisted in writing upon smoked glazed paper, to eliminate friction, first with knuckle, then with wrist, elbow, shoulder, hip and neck joints, and with eyes closed, first as fine as possible, and then to innervate so faintly that there was uncertainty whether there was any motion. Not only were the motions considerable, but increased from tabetic patients. Considerable individual differences were noted.

Maladies de Croissance. Par D. COMBY.

This little pamphlet assumes that if the growth of children was regular and in all directions, there would be no maladies of growth,

and that most of the latter are city bred. His studies are based on seven years' dispensary for children, and the treatment of 90,000 sick children. The most rapid growth is of bones, and is greatest in convalescence from typhoid fever and favored by recumbent positions. Often the skin cannot keep up, and shows in the thighs and knees and elbows, where growth is greatest, the *vergetures* seen on the abdomen in pregnancy. Too rapid growth predisposes to three great infections, tuberculosis, typhoid and acute osteongelitis. There is a tendency to deterioration. The pains of bone-growth, although vaguely located, are no doubt seated near the conjugal cartilages. Osteogenetic exostosis is most often in the basis of the epiphysis, but there are also arthrolytes, tarsalgias, periostitis. The circulatory system is often involved. Cardiac irregularities of many kinds, dyspnœa, occur. Fatigue is very quick and easy. The heart is often hypertrophied, and irritability, dullness and anæmia are common. The nervous system is most affected, and chorea and hysteria are common. The chief trouble is headache, which is very common from twelve to eighteen, and is often due to asthenopia of accommodation, and relieved by glasses. It is often associated with atony or dilation of the stomach with dyspeptics. The pain is often continued and frontal, and sometimes occurs in children who do not go to school. Nocturnal terrors, pains of an obscure nature in thorax and stomach, and dysmenorrhea are common. The propylaxis is more air and exercise and better food, with occasional friction and cold baths.

Etude sur l'Enfant Coupable. Par M. RAUX. Paris, 1890, pp. 268.

This is a compendious and admirable work by an expert, published as one volume of the *Bibliothèque de Criminalogie.* It surveys the family of juvenile delinquents, its sexual, moral and geographical position; classifies young criminals according to age, antecedents, crime, degree of instruction, length and results of punishment, and describes the new Lyons Reformatory, its buildings, administration and purposes. The intellectual, moral and professional education of the inmates is described, and the results compared with the latest criminal legislation.

System der Pedagogik im Umriss. Von PROF. A. DÖRING. Berlin, 1894, pp. 299.

The author is a gymasium director and a docent in the University of Berlin. He calls this work an educational Utopia, assuming that radical reformatory ideals are now of most practical service in education. In all essential points the author says he is opposed to Herbart, but without animosity. He is, however, constantly fiddling on the old Herbartian categories, nurture, end, method, interest, concentration, etc., and even uses training, practice, instruction, supervision, function, as if they were capitalized, and almost sacred entities, which his tedious analytic processes must not dissect and his synthetic methods could only juxtapose and arrange. That a chapter like that on the education of defectives could be so inanely general, ignoring every morsel of the rich pedagogical material so accessible in Germany, shows what an arid, abstract shablon-izing mind (if so barbarous a word may be for once tolerated) may be brought in the field of pedagogy.

Rhythm. By THADDEUS L. BOLTON. Worcester, 1893, pp. 94.

This is a thesis for the doctor's degree at Clark University, reprinted from the *American Journal of Psychology*, VI. 2, and almost the first

full experimental study of this great and fundamental topic, which underlies poetry, music, speech, and in a sense thought and will themselves. Plato would conduct poets out of his republic, and would banish the Lydian mood of music because it gave the soul wrong motions, with dances, choruses, liturgies, dramas, and if Professor Raymond is right, all art forms rest at bottom upon rhythm. Experimental study has hitherto been hindered by the difficulty of getting a series of taps, beats, clicks, etc., variable at will in interval and also in intensity and in accent. These technical difficulties Mr. Bolton overcame, and was then able to measure the carrying power of the mind for a series of uniform impressions, determine the most favorable rate, the individual differences in the mode of beating, and even the effect of both groupings and of accent. What form of a time manifold can be most completely and comprehensively held and carried in the mind, is a problem of vast economic scope in education, and suggests many inferences concerning the educational value of poetry, music, dancing, etc. The literature of periodicity, morbid and normal, is digested in the introduction.

Entwickelung u. Organisation der Volksbibliotheken. Von PROF. DR. ED. REYER. Leipsic, 1893, pp. 116.

This valuable compend contains some psychological and educational matter. It appears that Massachusetts has as many free public libraries as all the rest of the country together. From seventy to eighty per cent. read literature, fiction or juvenile books; ten per cent. read history, biography and travels, and five per cent. natural science, medicine, industry and technology. The high per cent. under the first head declines slowly in favor of the latter classes of reading as the library continues. This shows that readers want diversion and recreation. Many chief topics of school are entirely neglected afterwards. Works of erudition, which mark great steps of progress, are read by very few. The author instances Bellamy, Mark Twain and Robert Elsmere as widely read and then neglected works. Boston, where most books are read, is slowly passing from French to German in its foreign taste. Although romanticists are preferred to classical writers, works without deep content, no matter how great their popularity, soon pass to neglect, although even good society reads books of doubtful morality, censorship should be avoided for all but the worst literature. Most striking of all is the fact that the greatest greed of reading is from the ages of 15 to 22, and greatest of all at 20. Thus ten per cent. of the young people at this age do forty per cent. of all the reading. Before twenty the curve ascends very rapidly, to fall off afterwards yet more rapidly. Probably young people would like to read more, but the need of bread-winning is now imperative. After 35 very little reading is done.

The Rural School Problem. J. H. BLODGETT. *American Anthropologist*, VI. 1893, 71-77.

This is a study of the statistics of the rural schools (particularly of Massachusetts) in relation to the following tests: Amount of money appropriated per child of legal school age; per cent. of taxable property thus appropriated; ratio of average attendance to the school classes. Nantucket, which is last by all three tests, has, nevertheless, good schools, and in 1885 there were in Dukes and Nantucket no convicts whatever. Mr. Blodgett treats briefly of the differing advantages of rural and urban schools, and thinks

that the law of compensation works not a little in the case of the latter, where the child is brought earlier and more largely into touch with nature. A. F. CHAMBERLAIN.

Les Ecoles mixtes. M. T. NANDY. *Revue Pédagogique*, N. S., Tome 23, 1893, 97-104.

M. Nandy, who is a normal school director, discusses here the question of "mixed schools," a subject to which considerable attention is now being given in France. Citing the stirring words of M. Jules Ferry, spoken at the pedagogical congress of 1880: "Gentlemen, what we want of you all is to make us men before making us grammarians," he pleads for the instruction of young children of both sexes (under 9 years of age) by women. This, he thinks, would bring with it many moral and social advantages—would decrease the number of old maid teachers and would tend to make the school resemble a little more the family, and allow scholars to grow up more human to become better men and women.
A. F. CHAMBERLAIN.

Erzählung und Drama. Lehrproben und Lehrgänge aus der Praxis der Gymnasien und Realschulen. (Halle, a. S.) DR. R. FAUST. 36 Heft, August, 1893, 55-61.

Some themes seem to lend themselves to dialogue-form and other reading-lessons would even call for dramatization in simple form by the scholars. The interests and imaginations of the young may be appealed to in this way and their powers of observation and memory stimulated and improved. But Dr. Faust has no intention of turning his school into a regular theatre, or of making his pupils professional actors. It is merely a school exercise.
A. F. CHAMBERLAIN.

Mothers and Sons, or the Problem of the Home Training of Boys. By REV. HON. E. LYTTLETON, Head Master of Hurleybury College. London, 1893, pp. 169.

Mothers are chiefly addressed. Feckless boys must never be nagged. Nagging indicates a failure of love. Girls are not always most religious, as is often said, but boys' emotions are deeper. At sixteen, boys are most irreligious. Sunday observance and church going and rational explanation of religious and theological matters are advocated. Altruism must be taught by small renunciations. The objects sacrificed for should be near. Appetite for plain food only should be cultivated. Diet should also be varied. Grub-shops are a great menace to health. Sweets are vastly overdone. Gluttony tends to impurity. Food appetites must be mastered or none can be. Useless dainties are a curse of boy life. Parents *must* all do some teaching. Aimlessness is very injurious and most boys should choose a trade young. There is no fatal sin except ceasing to try. We must be as gods to our children.

Per l'educazione del carattere. Secunda edizione corretta e aumentata. GIUSEPPE SERGI. Milano, 1893, VII. 287 pp.

In this work Professor Sergi endeavors to "study man a little more seriously." To quote his own words: "Let us leave the formulas and the schools; let us turn our attention to life as it unfolds itself in the inward soul of man and as it manifests itself in external actions amongst the other men with whom he lives, rejoices and suffers, laughs and weeps, raves, loves and hates.

Let us examine a little more deeply the character of feelings and actions; how it is that at times it is splendidly beautiful, at others a dangerous monstrosity, but more often a mixture of good and evil, of misery and grandeur. Let us try to find a means for the betterment of the human race by revealing to it the nature and the paths of its activity. Let us eliminate the vices and cultivate the good tendencies; let us take away every occasion that may lead to corruption and evil by the education of the good nature." In this spirit the author discusses the following topics: The immediate motives of actions; statics and dynamics of psychology; the individual and his surroundings; the formation of character; ethnic psychology; sympathy and communicability; influences and ordinary life; suggestion and epidemic psychosis; heroism and criminality; degeneration of character; the education of character; school and family; the education of woman; education for adults; journalism and reading books; amelioration of the human races.

A. F. CHAMBERLAIN.

Moral Teachings of Science. By ARABELLA B. BUCKLEY. New York, 1892, pp. 122.

The stars can give peace, and most mechanical as their motions are, by them we enter into His will. They give the sense of a vast power back of all. The highest religious duties are rooted in the lowest animals and passions. Man and mind were evolved by the hard struggle for existence. The virtues of the herbs can increase ours. They, like animals, teach mutual help. No change in dogma can affect these deep feelings. The least good is eternal and the greatest evil powerless.

Outlines of a Critical Theory of Ethics. By PROF. J. DEWEY. Ann Arbor, 1891, pp. 253.

This grew out of class-room work, and discusses fundamental ethical notions, the good, allegation, freedom. The ethical world of institutions is next considered, and finally, in the third part, come the formation and growth of ideals, the moral struggle towards realization and fully realized morality as cardinal virtues. The thought has the limpid liquid lapse of modernized easy-going Hegelism. These views began with Kant and ended, so far as freshness and originality are concerned, with Hegel. It is a dreamy, historical retrospect, without much practical vigor.

Primer of Ethics. B. B. COMEYGS. Boston, 1891, pp. 127.

This is a good abridged edition of the Rollo code of morals by Jacob Abbott, which has been long out of print. Twenty-one duties are illustrated by precept, and best of all by interesting examples for real boy life.

The New Theology. By J. BASCOM. New York, 1891, pp. 217.

This is the twelfth volume of this vigorous, incisive and too little known author. The new theology is the greatest religious fact of our time, and marks a great awakening in theology. The supernatural has its own nature. Miracle is the supreme term of the cosmos. Together they give and mark a moral sense of power to which the natural gives expression. Natural underlies revealed theology. The end of church work should not be to huddle men into it, but to go forth to conquer the world.

The Crisis in Morals. By J. T. BIXBY. Boston, 1891, pp. 315.

The crisis is between the hedonic morals of Spencer, which too much ignore the inner realm of purpose and conscious duty and

conception of life as pressure upward; everything being moral which favors this progress, and all immoral which opposes it. This pressure is the measure and purpose of progress, and is marked by a vital solidarity of the individual soul with the universe.

La Asignatura de Derecho en la Ensenañza Normal. Boletín de la Institución libre de Inseñanza (Madrid). PROF. D. G. SAMA. Año XVII. 1893, 177-199.

The decrees of August 13, and March 22, 1884, placed morals and ethics in the curriculum of the central normal school for female teachers in Madrid (for teachers in the elementary, higher and normal schools), and the government has now the intention of still further extending the reform. Prof. Sama gives a brief syllabus of the course he recommends. A. F. CHAMBERLAIN.

Anthropometrische Untersuchungen in Worcester, Mass., Amerika, Uber Schulkinder. By GERALD M. WEST, A. M., Ph. D.

This is a very laborious work of 28 octavo pages, with many pages of tables, embodying the results of careful measurements of 3250 school children of Worcester, Mass., while the author was a fellow in Clark University. So many points were considered in devising the measurements, and the statistical results were treated in ways somewhat technical if not novel, that it is impossible in our space to state all the results. Those interested must be referred to the original paper itself. Entire height, mean variation of stature, weight, length and breadth of head, breadth of face, and the comparison between the last three; relation between breadth of face and length of body, between breadth of face and of head, between stature and weight, for children of different age, sex and nationality, —are plotted in pages of very instructive curves, to show especially the laws of growth.

L'Etat Actuel de l'Anthropologie Criminel le (Crimindle). M. ZACREWSKI. *Revue Scientifique*, Tome 51, 435-437.

This is another of the articles called forth by the congress at Brussels in August, 1892, and the writer complains of the inexactness and inaccuracy of the name "criminal anthropology"—it is no more proper than "military anthropology," or "naval anthropology," for there is no criminal race. Two-thirds, at least, of the themes of the new anthropological school of criminologists are a new sort of metaphysics without the basis of proper observation or strict experiment. The most important question, then, to be discussed at the next congress of criminal anthropology in Geneva, 1896, is the definition of the science. A. F. CHAMBERLAIN.

La Structure intime de la Matière organisée. R. D'ERLANGER. *Revue Scientifique*, Tome 51, pp. 423-429.

Discusses the theories of Haeckel, Remak, Leydig, Künstler, Martin, Altmann, Bütschli, etc., approving of the last as affording the best solution of the problem of the interpretation of the structure and functioning of organized matter in relation to physical phenomena. A. F. CHAMBERLAIN.

Une Génération qui s'en a. M. V. TURQUAN. *Revue Scientifique*, Tome 50 (1892) pp. 755-758.

This paper—an interesting study in demography—deals with the statistics of the St. Helena medalists, survivors of that proud generation which saw the light under the first republic, and shared in

the glory and the disaster of the first empire. The first list of pensioners, drawn up in 1870, contained 43,592 names; in 1892 they number but 27, and hypothetically the closing year of this century will see the last one vanish. The oldest now living served with Bonaparte in Egypt and is 106; the youngest is 92. M. Turquan gives several tables and curves relating to the mortality of these medalists. A. F. CHAMBERLAIN.

Les Théâtres au Point de vue optique. M. RENÉ DE SAUSSURE. *Revue Scientifique*, Tome 52, 1893, 353-367, 393-400.

M. de Saussure in this interesting paper, which is accompanied by some thirty figures and diagrams, treats of the construction of theatres from an optical point of view. He discusses and criticises the various sorts of halls and main rooms, the arrangement of pit, orchestra and galleries, staging and seating. His essay is useful as pointing out defects which may be very injurious in a country where so large a proportion of the young are in the habit of attending these places of amusement. A. F. CHAMBERLAIN.

Notes on the Development of a Child. By MILICENT W. SHINN. Berkeley, Cal., 1893, pp. 88.

This is one of the "University of California's studies," and is approved as a thesis for the degree of Ph. D. Professor Joseph Le Conte writes a preface vouching for the reliability of its observations, and says it is impossible to over-estimate their importance, but Wells adds that interpretation is difficult and that the subject is in its infancy. The child was a healthy girl of purely American parentage, and the studies extend to the last quarter of the third year. The observations are more acute, unremitting, and more sympathetic than any yet published. The author, who is the editor of the *Overland Monthly*, judiciously refrains from conjectures, and states the facts with admirable lucidity and objectivity.

The Country School in New England. By CLIFTON JOHNSON. New York: Appleton, 1893, pp. 102.

This book is rather luxuriously gotten up and is illustrated by nearly 50 photographic illustrations taken by the author. The text is also very objective and describes books, desks, dinner-pails, passing the water, hard sums, school penalties, etc. It has a slightly historic character, and will bring vividly and pleasantly to mind for adults who ever attended country schools many half-forgotten scenes and details. The samples of children's drawings and definitions give the last part of the book a humorous cast.

The Psychology of Childhood. By F. TRACY. Boston: D. C. Heath, 1894, pp. 94.

This is a thesis for the degree of Ph. D. at Clark University, and is an attempt to give a concise digest of all the work that has been done on the psychology of infants. No such work exists and it should be very helpful to normal schools, psychologists and all interested in the subject. References are given and a select bibliography of 100 titles is appended. Perhaps the best and most original part of the treatise is the long chapter on the early development of speech. Dr. Tracy collected and digested vocabularies of nearly two dozen infants. These are tabulated and digested and must interest philologists.

Mental Development in the Child. By W. PREYER. Translated by H. W. BROWN. New York, 1893, pp. 170.

This is a digest of Preyer's two volumes on the mind of the child, done in a quarter of the space, and with the points of view greatly ripened and enlarged. The importance of testing and opening as widely as possible the gates of all the senses of infants is considered, on the assumption that nothing gets into the intellect save through the senses. The author describes the slow composition of the ego by the gradual unification of the different centres for ear, eye, hand, etc., which unfold to some extent independently of each other at first; the great importance of freedom from all restraint, of getting out of nature's way by suggestion and imitation. The importance of early infancy is illustrated by Vierordt's statement that at the end of the first year of life the brain weighs two and one-half times as much as at birth, and gains from that time on through the rest of life only about one-third more. There are no innate ideas, and even self-consciousness is slowly unfolded, the skin being at first the boundary surface between subject and object. Almost nothing is said of children as old as the first period of school life.

Evoluzione della Voce nella Infanzia. DR. A. GARBINI. 1892.

The development of the child's voice is a theme on which there is little of scientific value to be found in either musical or medical literature. The author's studies follow the child to the sixth year. The laryngoscope was used, but not the phonograph. The author asks, but does not answer, the question whether the early natural sounds of children are alike in all lands. He would have the range intensity registered and quality of voice for each age carefully determined. Although the work is based on the examination of 400 children, the results are tentative and rarely statistical. The first cry is a reflex, but the child is building its own voice during the first two months. The average frequency of distinct cries has declined from 60 to 40 per cent. The tone is not individual before the eighth month. Tones are stronger and not more than 27 per months. During the next ten months tones are differentiated very rapidly.

The New Life—a Study of Regeneration. By ARTHUR H. DANIELS, B. D. Worcester, 1893, pp. 48.

This is a reprint containing the author's thesis for the degree of Ph. D. at Clark University. The chief initiation rites at puberty are first collected. Their universality and drastic nature among savage tribes are striking. After discussing the meaning and nature of these ceremonies, the author proceeds to the physiology of adolescence, normal and morbid; presents statistics showing that these years are those of most frequent conversion as well as of confirmation. Last come the theological and pedagogic implications. It is an able and comprehensive work on a new and vital subject.

L'Idiotié. Par LE DR. JULES VORSIN. Paris, 1893, pp. 295.

This is a general treatise on mental degeneracy and the education of idiots, and is illustrated by 17 wood-cuts. The volume grew out of a series of lectures at the Salpetriere. It is a study of the instincts, sentiments, will, intelligence, physical character of each type of idiots under his charge, and of the treatment and education which he deems best to fit them out to be a charge to others.

NOTES.

1. Japan at present is divided into about forty-five prefectures or government districts, the most of which nearly correspond to the provinces into which the country was divided until twenty-five years ago under the feudal system. As a rule there are in each prefecture one ordinary middle school and one ordinary normal school. In a few cases, however, a prefecture includes two or even three of the former provinces; and then it sometimes happens that, besides the one ordinary middle school of the prefecture located at the capital, there is another ordinary middle school in each of the other provinces located at the former seat of the chief of the province. These latter schools are private in that they are not supported by taxes, but by voluntary contributions, largely from the estate of the former chief of the province; but they are under government control, and do not differ essentially from the others. The school from which these notes are written is one of these private schools.

2. This province has a population of 368,000. There are eight higher elementary schools in the province, with a total attendance of about 2,800. A private school which prepares scholars for the ordinary middle school has an attendance of 130. A few of the ordinary middle schools have a preparatory department. There are girls in the elementary schools, but not in the middle schools.

3. At the beginning of the present school year, 121 scholars were admitted to this school. Of this number, 30 who came from the higher elementary schools with an average standing of 80% or more, were admitted without examination. Of those who were admitted on examination, 61 came from the higher elementary schools, and 30 came from the private preparatory school. The ages ranged from twelve to nineteen. The average age was about fifteen.

4. The total number enrolled at the beginning of the year was 326, distributed as follows: 1st class 31, 2d 21, 3d 42, 4th 57, 5th 175. Among these there were 81 who failed to be promoted at the close of last year, namely, in the first class 7, 2d 3, 3d 1, 4th 16, 5th 54; and there were 33 who have not been in attendance during the first two terms of this year, namely, in the 1st class 2, 4th 6, 5th 25. The numbers present in the respective classes at the examinations at the close of the first term were 29, 18, 36, 48 and 136; and at the close of the second term 26, 14, 21, 45 and 130. The numbers enrolled at the beginning of last year were 22, 39, 31, 81 and 129.

5. The fourth class is divided into two sections, and the fifth into three. Each class or section has its own separate room. The sections in this school are somewhat larger than the average.

6. The school year is from September 11th to July 24th. There is a vacation of two weeks, beginning December 24th, and another of one or two weeks in April. The school is in session five hours a

day, six days in the week. The recitation hours are each fifty minutes long with ten minutes between. School begins at nine o'clock from November 1st to March 31st, at eight o'clock in September, October, April and May, and at seven o'clock in June and July. A Japanese scholar goes to school as a man goes to his daily work. He gives his whole time to it. If this gives him the air of a man when he ought still to be a boy, on the other hand it tends to prevent him from unduly retaining the ways of a child.

7. There are eleven Japanese teachers and one American instructor. One of the teachers is a graduate of the Imperial University and one is a graduate of the higher normal school. Most schools of this size have from fifteen to eighteen teachers. As a rule Japanese teachers make teaching a profession rather than a stepping-stone to something else. Perhaps one-fourth of the ordinary middle schools employ Europeans or Americans, chiefly, or only, to teach English.

8. Accompanying is an outline of the course of study:

Outline of Studies in the Ordinary Middle School of Toyotsu, Fukuoka Prefecture, Japan.

Subjects.	Fifth Class. No. of Hours per Wk.		Fourth Class. No. of Hours per Wk.		Third Class. No. of Hours per Wk.		Second Class. No. of Hours per Wk.		First Class. No. of Hours per Wk.	
Japanese writing.	1		1							
Classical Japanese.	3		3							
Japanese and Chinese Composition.	1		1		1		1		1	
Chinese Language and Literature.	1		1		4		1		1	
Moral Precepts (in Chinese).	1		1		1		1		1	
English. Reading.	2	Third Reader.	1	Fourth Reader.	1	Fourth Read.				
English. Writing.	1									
English. Dictation.			1							
English. Conversation.	2		1		3					
English. Grammar.			2	Elementary.	2	For Japanese.				
English. Composition.							2		2	
English. Rendering into Japanese.	3	Third Reader.	3	Fourth Reader.	2	Fourth Read.	3	Lamb's Tales from Shaks.	2	Johnson's Rasselas.
English. Advanced Reading Conducted wholly in Eng.							2	Hawthorne, Selections.	2	Hawthorne and Irving.
German. Gram. and conversat'n.							1		2	
German. Reading and Renderi'g.									2	
History.	2	Japan: Lect.	1	General Lectures.	2	China: Lect.	1	Japan: Lect.	2	Universal.
Geography.	1	Japan: Lect.	2	Asia & Europe: Lect.	2	Afr. Am. & Ocea. Lect.	2	Physic'l: Lect.		
Arithmetic.	4		1	Lectures.						
Algebra.			3	Lectures.	3	Elementary.	2	Treatise.		
Geometry.	1	Plane: Lect.	2	Plane.	2	Plane.	2	Solid.		
Trigonometry.							2		3	
Physiology.					2	Lectures.				
Zoology.	2	Lectures.							3	
Botany.	2	Lectures.							3	
Mineralogy.	2	Lectures.								
Chemistry.			2	1st term Fr. from Science Primer Ser.			2	Lectures.		
Physics.			2	2d & 3d terms					3	Lectures.
Drawing.	2	Free Hand.	1	Free Hand.	2	Mechanical.	1	Free Hand.	1	Perspective.
Gymnastics.	3									
Military Drill.			3		3		5		5	
Total No. of Hours per Week.	30		30		30		30		30	

American or English text-books are used in English reading and elementary grammar, in universal history, algebra, solid geometry and trigonometry. A lack of suitable Japanese text-books accounts for so many courses being given by lectures. In most of the instruction in geography, for example, the teacher follows closely one or two American text-books.

Each scholar has from fourteen to eighteen subjects upon which he must pass examination twice every term, and once at the close of the year. A general average of 60% or more is required for promotion to the next class. If in each of more than two subjects the average for the year is less than 60%, or, if in each of more than one the average is less than 50%, the scholar is not promoted.

The Japanese seem still to retain the Chinese idea of education—*to communicate* rather than *to develop*.

9. Of the twelve who last July completed the work of this school, four, who had an average standing of 80% or more, and two, who had an average standing below 80%, entered without examination the first and second classes respectively of the preparatory department of the higher middle school of this district; two entered the normal school of this prefecture; three are teachers in the higher elementary schools, and one is studying mathematics and physics in Tokio.

Of the twenty-two who completed the work in another ordinary middle school in the last two years, nine are in the higher middle school; two are teachers; one is studying telegraphy; one is in an engineering school; three are in the school of science attached to the university; two are in other schools in Tokio, and four are at home.

Even the best scholars that go from the ordinary to the higher middle school have much the same work during the first year in the latter that they have during the last year in the former.

10. There are frequent departures of scholars for student life in Tokio, seven hundred miles away. Perhaps twelve or fifteen go from this school to Tokio every year. Usually the ones who thus leave are the ones who have fallen behind their classes here.

The American instructor in a school about four hundred miles from Tokyo says, "Here, in certainly half the cases of that kind, it is the best scholars who go to Tokio."

[Before speaking of expenses and salaries, it is well to say that the *yen* and *sen* correspond to the dollar and cent. They are of about three-fourths the value of the latter, but their relative purchasing power is much greater. A carpenter's wages are about 30 sen a day. A policeman receives from 8 to 12 yen a month. A clerk receives 6 or 7 yen a month, where a man in America would receive 20 or 25 dollars.]

11. The tuition fee for scholars living in this province is 40 sen a month eleven months in a year. Scholars whose homes are not in this province, of whom there are twenty at present, pay 50 sen a month. In most schools the tuition fee is higher, being as high as 1 yen 50 sen in at least one.

12. About seventy of the scholars are boarding at the school. Places in which to study and to sleep are provided by the school without charge. Board is from 1 yen 65 sen to 1 yen 80 sen a month. A scholar's total expense for one year, including the price of books and clothing, usually does not exceed 40 or 45 yen. In many of the schools the expenses of the scholars are 20 or 25% higher than here.

13. The salaries of the teachers are from 8 yen to 80 yen a month twelve months in the year. The graduate of the Imperial University receives 80 yen and the graduate of the higher normal school 55 yen.

14. Four hundred and thirty yen are expended every year for books, maps, charts, and apparatus. The total cost of such equipments in possession of the school at present was 6700 yen.

15. The control of the school is in the hands of a director, who holds his position by government appointment. He is in daily attendance. but does not teach. In some schools the director does a little teaching.

16. With the exception of the room that is provided especially for the American instructor, none of the recitation rooms are heated during the winter. There are thirty or forty days when the temperature out of doors is not far from the freezing point; and within the rooms it is not much warmer. There are at least four months when for an American school, fires would be considered essential. Some of the schools are provided with stoves, but as a rule, either there are no means of heating or there are only small charcoal fires.

The home life and training of the Japanese scholars are such that sitting in a cold school room is not the hardship to them that it would be to American scholars. But it produces an immediate depression of their energies, and it is depressing in another and more far-reaching way. A scholar who goes from the piercing cold into a school room where he can study with scarcely any thought or feeling of temperature, is made a partaker of man's mastery over his surroundings, and there is being developed within him a sense of his own ability to overcome. The scholar in the cold school room is being trained to endure rather than to overcome.

ELMER E. HUBBARD.

The following suggestion was made at the Williams Centennial by Dr. G. S. Hall: "One of the most peculiar features of this college, my *Alma Mater*, in which it surpasses most colleges of the country to-day, are the six or seven beautiful and expensive secret society houses. These add greatly to the beauty of the village and of the college life of those who frequent them. Their reunions are among the most attractive features of commencement and bring us often here when we should not otherwise come. They all stand for fraternity and good fellowship, and cultivate sentiment and *Gemüth*, in which the American temperament is apt to be deficient. The heartiness, franknes give vividness to the life of the feelings that keeps men "conserved youth" in old age. Now to maintain all these qualities on the highest plane, I suggest that each of these Greek-letter fraternities that can afford it, establish (by an annual sum for a few years of experiment if preferred) one resident fellowship, scholarship, tutorship or lectureship for a promising graduate of their fraternity who wishes to study further. He might be appointed from another chapter than Williams, and for one Society in one subject and another in another. He should reside in the building, where his presence would make for culture and give an Attic salt of intellectual interest in individual cases if needed, and could not fail to aid the college authorities in maintaining a spirit of coöperation among students. He might conduct research, possibly give an occasional lecture in the college; act as advisor to students in lower classes, or even coach backward men. Of course I wish my Society might be the first to do this and have advocated it for years, but I would welcome such a movement anywhere. I do not think it would work well in the Chapters of every college. Now the point is to secure the presence of a student devoted to student-work and making his presence felt. What this would lead to, it is impossible to see. Whether these institutions would ever

develop in the smallest way one of the features of the colleges of Oxford and Cambridge, it is of course idle to ask. They would be a strong bond between the college and the wealthy graduates, and interest them in its inside work. Such positions ought to be objects of ambition to many men. In this last connection it is not without interest to read Professor Jebb's address at Cambridge, England, on "The Work of the University for the Nation." The colleges, at first club and boarding houses, arose to intellectual prominence at the time when the universities were at their lowest ebb. The crusade against the Lollards had brought sterility, the failure of unbelief had brought intolerance, and the proper work of the university was never so diverted from the life of the nation. The colleges then grew, brought security into the disorderly life of the student masses; substituted the new classical learning in place of the old university scholasticism and opened the age of humanistic studies in England.

An interesting new departure was made at the Williams centennial in October by giving one-half day to an educational conference, at which representatives of different institutions presented papers. Dean Judson of the University of Chicago urged that every course in every academy or high school should immediately articulate with some course in some college, so that no boy or girl should complete a course in these lower schools without being able to enter a college. Thus we suppose a state university would be the 15-18 grades of the state school system. Principal Greenough of Westfield pleaded for courses of pedagogy in colleges, for their culture value to parents and citizens. Dean Griffin of the Johns Hopkins pointed out how a small and indeed decreasing number of students in schools of law, theology and medicine had ever been to college; commended the plan of expressing requirements of graduation in terms of work rather than in terms of time; thought it unfortunate that the traditions of four years should have become so firmly established and favored the doing the first year of professional work in colleges. Chancellor Snow favored the certificate system of admission, and stated that it was now under control by visitation by the Uniuersity of Kansas with 75 high schools. It is well for college officials to know teachers and future students. Extension work gives the professor a healthful sense that he is a servant of the public, and stimulates him by contact with practical life. Dr. C. H. Gross of Harvard thought research gives love of work and zeal for truth, and should be undertaken by those who intended later to enter the professions from its educational value. The difficulties of investigation are the best training for future life. It elevates the tone of academic life. He favored travelling fellowships at Williams and deprecated the fact that so many American students go to Germany. Professor Safford of Williams traced our college system to Emmanual College, told of the interesting effort to substitute French for Latin in the early history of the college, proved the genesis of Chauvenet, favored the retention of a free graduate student. Dr. G. Stanley Hall of Clark, who presided, closed the meeting by pointing out what he thought to be lines of future university development in this country.

It is surprising to note how many educational influences are working *from above downward*. This was one of the principles first formulated at the opening of Clark University. The traditional American way has been the exact reverse of this, to begin

at the bottom and work upward. In the west many preparatory schools have been founded, in the hope that they would grow into colleges, or that the college department would outgrow the preparatory school. Where has that ever once occured save on paper? The whole history of education also shows that the lower schools have little power to ever reform themselves. Educational influences not only work from above downward, but universities originate the material of culture and lower schools are canals for its distribution. Now most of the state universities led by Michigan inspect lower schools as part of its certificate system. Harvard has strengthened its hold on preparatory schools by founding and controlling the New England Association of College and Preparatory Schools, by the Cambridge experiment, by the work of the committee of nine to revise school courses, and by establishing a chair of pedagogy. Although President Eliot always objects to all that he understands by the term, many would extend it to cover all his own admirable activity ever since he first wrote his articles on the elective system, and a great deal more. The activity of Professor Barnes of the Stanford University among teachers of the Pacific coast is an excellent example of working from above downward. The successful installation of his 40 experiments in physics by Professor Hall of Harvard; the establishment of the PEDAGOGICAL SEMINARY, the *Educational Review* and the new educational JOURNAL by Cornell; the rapidly increasing participation of college men in the work of the historical Educational Association, despite the protest made against them in the Board of that body a few years ago; the great growth of the college and university section of that body last summer; the work now being begun by Professor Byran of the Univestity of Indiana; the growth of college and university summer schools; the affiliation work attempted by the University of Chicago to secure greater economy of adjustment; the *best* text-book work by professors; university extension work; all these are new currents from above downward. That they are good no one can for a moment doubt.

As to university extension, it may well be doubted whether the same necessity exists here as existed in England. There it was not only philanthrophy, but a prudential back-fire against always impending parliamentary investigation and readjustments. In our state universities it has an analogous value. But must possible legislators have university science brought to their doors as a condition of voting supplies? All would deprecate the future development of such a sentiment in our newer and often too socialistic states. Its effect on the universities can only be disastrous. Chancellor Snow of the University of Kansas informed us at the Williams centennial that the people want the *bona fide* professor in these lectures and no tutors or specialists set apart for extension work only. This, if not university distension, is surely not the university "concentration" which constitutes the exactly reverse reform in France by which the public was shut out of the best work hitherto open to them, despite the newspaper outcry of esoteric courses, the new aristocratacy of science, etc. As to extension work by privately endowed universities, its value as a recruiting service for students is no doubt considerable, perhaps equal to success in intercollegiate sports. It is a method of beating the brush likely to bring better academic game than athletics. As to adding to the general culture or technical knowledge of the masses, it is in every way, form and degree good, but this does not seem likely to offset the injury to the growth of the professors into the

slow and laborious mastery of their own departments, which is the prime need in all academic centres, For this some leisure from the constant teaching of rudiments is needful. We should bend our chief efforts to the more immediate work of reconstructing the work of the lower schools. This is the crying need; by this we shall act most on the masses, and thus we shall least injure the precious upward impulse now stirring in all the highest grades of our educational system.

Of the German educational exhibit at Chicago, it is difficult to speak in terms of too great praise. That country has long been a leader in educational matters, and she has never made so complete and pains-taking an exhibit as now. Nearly the entire system of education in all its parts is included, and unlike that of France, it is well arranged and displayed. Unlike the multifarious exhibits of our own country, it is well unified on one plan. None of our states or universities ever made, or could make, such an exhibit. This will be apparent from the following "general details:"

First comes the large octavo volume, edited by Professor Lexis, on the German universities, with over 1000 printed pages. In this over seventy professors describe the present state of his own department, and all introduced by an admirable general sketch by Professor Paulsen. This volume is the best literary presentation of the plan and work of the German universities ever made. Next may come the official catalogue, unfortunately, like all the other printed matter, to be had only in German. This pamphlet of 197 pages contains a brief description of each of thirty-eight university exhibits. Among these are a pretty complete library of works on German universities, many heavy folio volumes of building-plans, bound in white leather and placed on reading cases, where each can be readily opened; a library on German pedagogy; an alcove devoted to university libraries, with all their appliances, and an expert at hand to show and explain all appliances; several shelves of approved text-books, especially complete for the lower schools. Very impressive and valuable is the volume containing a descriptive list of all the scientific journals of Germany. This volume contains 118 pages, and a rough estimate shows over 1200 periodicals. In another volume of 250 pages Professor Rethwisch gives an account of the higher or intermediate schools of Germany. It is largely an historical view, and will be especially welcome to those who wish to thread the maze of school legislation, programme and tabular views. A final chapter is devoted to a *résumé* of methods in each branch, and an appendix contains tables of attendance.

Next might come Otto Arndt's catalogue of pedagogical journals, year books and teachers' calendars. Of the former there are 239. These are later described by departments. In another pamphlet Hellene Lange describes the development and present status of higher schools for girls, and in yet another, Dr. Bachman describes the royal Elizabeth school in Berlin as a type of the better and higher schools for girls in Germany. Frau Henschke writes another memoir on supplementary schools for girls, which were started by Empress Frederick, whose portrait adorns the first page. The growth of these schools has been quite remarkable. Three further publications complete the official publications. The first is a volume of *curricula* and legal definition of the purpose and field of each class of school; the other is a compend of statutes relating to examinations of all the grades. The third is a heavy octavo, 338 pages, written like the rest by order of the culture minister, de-

scribing the volks and middle schools, and other lower schools of Prussia, with historical and statistical matter. For this purpose the year 1891 was chosen. The vast amount of information and detail here presented is admirably arranged for reference.

The chief part of the German educational exhibit, however, consists of apparatus illustrating, first, newer technical and scientific processes; and second, matter of instruction. The superiority of German lower and intermediate schools is nowhere more apparent than in the charts, diagrams, illustrative apparatus, and material and devices of all sorts, and in every stage of school life, and for each species of school. These are not only well chosen, but mostly well made to stand the wear and tear of use. Such apparatus gives teaching an interest, an effectiveness and a dignity it cannot otherwise have. There was less of the pupils' work exhibited, but it was sufficient to show the methods of each study and subjects, and was selected for this end rather than to show the proficiency of the children. This was again in striking contrast to the American exhibit, which was often designed to show the excellence of certain towns, schools, teachers and pupils.

Wilhelm Rein, the acknowledged head of the Herbartian school in Germany, and at present professor of pedagogy in Jena University and director of its famous pedagogical seminary, was born in Eisenach in 1847.

He studied theology at first, but soon his tastes led him to study pedagogy,—with Stoy in Heidelberg and Jena, and with Ziller in Leipzig. After receiving his degree, Ph. D., Easter, 1872, he was, successively, teacher in a gymnasium in Elberfeld, first teacher in the Lehrerseminar at Weimar, director of the Lehrerseminar in his native town, and in 1885 successor to Stoy in Jena. Prof. Rein has carried on the development of Herbart's ideas as begun by Ziller, but differs from Ziller in the breadth of his applications and in the great emphasis that he puts on "Social-pädagogik." Many teachers throughout Germany and Austria have told the writer of this sketch that Prof. Rein was not as independent a follower of Herbart as either Kern, von Sallwürk, or Dörpfeld, but this cannot be conceded. While it may be granted that he is no pioneer in promulgating new educational theories, the number of points in which he agrees with Ziller or Stoy proves nothing either for or against his independence; he is no blind follower of any one's ideas, and if his standpoints and the sturdiness with which he maintains them be taken as guides, it will be difficult to find a more independent educator in Germany. His labors have been directed chiefly to practical education, for he has realized that the needs of the time are of an intensely practical nature. Because of this fact, his position among German university professors of pedagogy is unique, and his courses on education of greatest attraction to American students here abroad. That Prof. Rein, with his experience in training elementary teachers and with his practical turn of mind, is at the head of a department of education in a German university, that he makes formal lectures in pedagogy and its kindred studies second to practical work in the seminary and its practice school, and that he has attracted to him men, through whom he is exerting an influence which is felt in every continent,—signifies much for the right development in the future of such departments in the universities of the world.

The creed at Jena is that instruction is of worth only as it educates, and that the teacher is the school, hence the great need of an

all-sided professional training. The advanced ground that Prof. Rein takes on the question of what should be demanded for a proper professional training, characterizes him as a pioneer in educational reform. Prof. Rein is a living type of the kind of teacher he wishes to develop; he is, toward others, benevolent, appreciative and encouraging, a character of the highest moral ideals and practice, and far more liberal than the average German of his class.

The followers of Herbart have disarmed their opponents to a certain degree and, at the same time, won many friends by bringing out practical applications of their leader's theories to school work; at the head of this literature must be placed *Theories and Praxis des Volksschulunterrichts*, which Prof. Rein wrote with Pickel and Scheller. Among his other writings may be mentioned *Pädagogische Studien*, a periodical of which he is not only the editor, but founder; *Aus dem Pädagogischen Universitäts-seminar*, and *Pädagogik im Grundriss*, which gives a general view of education from Herbart's standpoint in a very small compass. In addition to these, Prof. Rein has contributed constantly to the German educational magazines, has written an article on "Zeichenunterricht" in *Kehr's Geschichte der Methodik* and other works on drawing, and has edited the writings of several earlier educators. Prof. Rein is editing an "encyklopädisches Handbuch der Pädagogik." It is to comprise three generous volumes, and cover every department of education, including its fundamental sciences. The articles are written by representative men from all over Germany.

F. W. ATKINSON.

A brief study of the love-poems in students' papers made at Clark University has brought out the following points: Of the whole number examined (356), 26 were either indefinite, or referred to love but incidentally; of the remaining 330, 270 made mention of particular physical charms. Of this last number, 232 were serious in tone and 98 were mocking. The features most noted were: Eyes, 91 (expression, 50; color, 41—in which blue leads with 22); hair, 51 (color, 37—of which golden has 28; arrangement, 9; texture, 4); face, 24. Among the poets who refer to the face, 13 are charmed by its brightness, 4 find it sweet; only one notes an intelligent face. The evident predilection for blondes is plainly a matter of heredity; this heavenly complexion has been sung and painted into the condition of a stock article. Nose and ear have each 4 references; teeth, forehead, tears, bosom and waist have but one each. References to action, even under the most liberal interpretation, are found in but 110 poems. That most natural of lovers' acts—kissing—is mentioned but 66 times; 5 of these are sun or wave kisses; 29 are mere allusions; 19 times he kissed her, in dreams or otherwise; forty-four cases of action, exclusive of kissing, are noted, *e. g.*, he walked or rode with her, fed her cream, danced, stole a kiss or squeezed her hand. For her part, she sang and sighed, pouted, chewed gum, and smiled a great deal. Of mutual action, once they sit down and look at each other; another time they flirt. But all their doings, singly or together, are very feeble and unreal. Some study was made of children's plays, and also of their behavior to one another, with a view to note expressions of favor. Of 128 games played in common by boys and girls, 21 were noted as general. Of these, 10 have no interest, save as motion games; however, play for the sake of exercise only, is not so frequent. The remaining 11, by far the more popular, under natural conditions, at all events, are all on

kissing lines. The verses sung in their performance tell more or less of coming lovers and weddings. But modern school life is not favorable to such games, nor does city life give much room for old-fashioned play. This repression has, in the opinion of several experienced teachers, tended to check manifestations in or about the school of childish affections. At all events, so they say, such expressions are much less common now than in former years.

D.

In his address before the third annual convention of the College Association of the Middle States and Maryland, President D. C. Gilman asks if it is worth while to uphold any longer the idea of a liberal education. He cites General Walker, that the technological institute produces "better educated men in all that that term implies than the average graduate of an ordinary college;" President Jordan, that the college "belongs to the babyhood of culture," and Professor Goodwin, that there is a breaking up of old opinions as to what should constitute a liberal education. Cicero, the scholastic, the church, the Puritan, the English universities, etc., all upheld the idea of a liberal education, which implies training in the power of concentration, of classification, retention, expression and judgment. First, each should know his own physical and especially nervous and brain organization, then should follow his own language and its literature, the principles and methods of scientific inquiry—the great literature of the world, and the general history of culture.

A teacher writes us on the difference between boys and girls as follows:

Girls are more original in compositions, etc., and boys in science work, where girls are too verbose, and go more upon memory than the boys. Boys have an inquiring, experimenting spirit far more than girls. Much of their mischief is due to a perversion of this spirit, and much of a girl's lack of mischief to the absence of it. Moral: Girls are less independent than boys, and have a stronger sense of propriety. This is another cause of the difference in conduct in school. It is the cause of their playing less than boys, rather than any natural disinclination to exercise. The girl studies because she is told, or because it is the proper thing—the boy because he sees the use of it. Girls are more often honest, but the honesty of a really honest boy is more thorough than of most girls. I have exaggerated the differences for brevity.

Principal Joseph Jackson of Worcester sends us samples of the French "book of monthly exercises," adapted to the modified purpose of showing the parents at stated intervals specimens of the school work of their children. The corrections in red ink tell the story and the series is preserved. All the work of a given lesson was done in the book and in the usual class time. To correct each lesson it took about twenty minutes. All teachers concur in the following statement: "This work encourages an absolute standard for each pupil—his best. Pride and ambition are cultivated. There is a dislike to have the book defaced with red ink. Parents have an opportunity to see the continued effort of their children and the result in detail. This, as some parents have affirmed, is much more satisfactory than the indefinite term report. There has been definite improvement in many cases in hand-writing and general neatness. The restriction laid upon the pupils in the matter of erasure of errors has led in many cases to more forethought in all *daily* work."

To test the question whether children form distinct mental images when words are spoken, E. A. Kirkpatrick of Winona, Minn., lately a student at Clark University, pronounced the words: church, book, drum, tree, horse, day, chair, stone, man, lamp, one at a time, and had the children write down what was suggested, describing color, size, etc., if they saw these qualities, and if it was not visualized, but heard or felt, to state the fact. The answers were of all grades of distinctness, but a standard of classification was at length hit upon. Visual images were inferred in about three-fourths of all, but these were favored by the pauses between the words, which made the conditions very different from ordinary reading, and the suggestion of imagery probably favored it. On the 200 normal pupils without this suggestion, clear images were ten per cent. less. Girls seem most prone to images and they decrease up the grades, being less in collegians. This is the law for most except pointers according to Galton. The tendency to form vivid images declines just before puberty, is very intense in boys at fifteen, and in girls at fourteen, and then rapidly declines to seventeen, and then continues to decline or grow, according as occupation favors it or not. Of the above words, "church" was least general and produced most imagery; next came "book." "Drum" called out very few auditory images. After one month, a repetition showed ninety per cent. of images the same and nearly all of equal visual distinctness. But two or three per cent. of the images were clearly auditory, tactile or motile. Our images are as characteristic and constant as our features. We are poor judges of our quality of mentality in this respect.

The monthly journal called *University Extension*, and now the *Hand-book of University Extension*, shows commendable zeal. The American or Philadelphia society reports 159 courses, 139 of which are six lecture courses, and at over sixty different places. At many of these places more than one course was given. We can nowhere find what is a point of great interest, viz., a statement of the number who have been led to college or university by these courses. The courses most sought are social, political, literary, technical or economic. Bible courses seem to be increasing. The vastest organization of this sort is that of the Chicago University. Besides an extension faculty of twelve, there are twenty-two university teachers who offer courses and nineteen lecturers. The work is divided as follows: I. Lecture study department, with many courses. II. Class work department. III. The correspondence teaching department. IV. Examination department. V. Library department. VI. Training department. VII. The U. E. World. VIII. University work for extension students. It is to be hoped that the extension teachers will do their work so well that local centres will be content with them and not cry for the established professors, and also that extension teachers will not take the attitude toward university work proper, seen in M. E. Sadler's reply to Professor Palmer, who is so fond of allusion to culture that is exclusive that he keeps the eager people at arm's length. His spirit reminds one of that of the young physicians who give the outside special courses with their own polyclinics at Vienna. Extension in England was established to bring sympathy between universities and people, not to arouse suspicion and prejudices. While the question of endowment for extension is still unsolved, those universities encouraging extension must sooner or later develop a policy concerning the admission of successful extensioners to full membership in faculties.

Professor Nussbaum, the well-known physiologist, in a recent article based on a medical practice of twenty-nine years, pleads for a balance of head and body training. His practice has shown him but very few made ill by over-working their bones and muscles, but very many ill from over-working nerves and brain. The human body was not made for the student's desk, but for free exercise. Four or five hours of well distributed work would do more than seven or eight as usually conducted. He has seen many children kept from school work till eight or nine years old, overtake at sixteen those who began at six.

Among 600 pupils of a Hamburg gymnasium, Erismann found thirty-two per cent. with abnormal nervous systems, and these disorders increased up the grades. Among 310 girls in a lower public school, thirty-six per cent. were anæmic. Kollmann now concludes, from careful comparison of many such studies, that about thirty per cent. of the school children in Europe have abnormal nervous systems, and that, beginning with almost nothing in the lower classes, the per cent. reaches sixty-six in the last gymnasial year.

The Right Honorable G. J. Goschen, M. P., has allowed two addresses, one on the cultivation and one on the use of the imagination, to be published (E. Arnold, 1893). Disciplined imagination makes for sympathy, science, morals. In debate we must put ourselves in the point of view of our opponent; in social reform, of the lower classes. We must forecast the future. The teacher needs imagination to get in touch with pupils, and must arouse it in them. With it the preacher takes the heart captive. It forbids cruelty to animals and kills intolerance. Astronomy, geology, molecular physics and other branches of science dwell as high on the Parnassus of imaginative inspiration as poetry and music; space of more than three dimensions, vortices, the formation of fruitful hypotheses, the re-vivification of the obsolete, all prevision and prediction in which science culminates; the power to enter the minds of others; Bellamy's "Looking Backward;" all Utopias and prophetic romance; "The Battle of Dorking," historical novels; Shakespeare, Goethe, Darwin;—these are all products of imagination of synthesis and construction as opposed to the eternal school-bred analysis. He pleads for Alice in wonderland instead of the Tommies and Freddies which are photographs of common child lives.

F. W. Atkinson has published his Leipzig thesis on "The Professional Preparation of Secondary Teachers in the United States," in sixty-four pages. It seems at first glance strange that an American graduate should go to Germany to take a degree upon a thesis about an American subject. The essay is, however, better than we should expect and is very modern, dealing chiefly with recent movements, as was of course necessary. The movements at Michigan, the University of the City of New York, at Harvard, Clark, Cornell, journals, etc., are described. Almost no criticism is attempted.

Ernest Richards, principal of the Hoboken Academy and a member of the School of Pedagogy of the University of New York, has published a valuable chart illustrating the German school system, with sixteen pages of text. It should be enlarged and used as a wall map in every normal school and college where pedagogy is taught.

Investigations are under way in Berlin concerning defects of speech organs in school children; not merely stuttering, but other imperfections seem more common than was supposed. In Switzerland it is suggested that the school doctor who examines eyes, should also report on the state of the organs of speech.

Leichtenstein urges that our organism resists the effort to write with the left hand *toward* the body or adductively. Of eight left-handed children, four wrote vertically, from up down. The writer knows a left-handed boy of seventeen, who writes upward on a line going from the body, and writes rapidly and well. Whether mirror script be a tendency or not, it seems probable that there is a reluctance to write with the left hand on a line going to the right.

School baths and gardens are increasing in Germany, and in many parts of south and central Europe. The plans and norms for the use of both have recently been a subject of much discussion.

Drs. Brunner and Klausmer have examined the spinal columns of 2129 school children in Munich. The general result was that traces of rickets were found in thirty-six per cent. of the boys and thirty per cent. of the girls in the lower class. This of course was not due to school, but shows great sensitiveness of the spine. Scoliosis was more frequent with girls. Few will hold or even know how to sit in an erect position. They sit in a collapse attitude and often with crossed feet or legs. Boys are more apt to take habitual abnormal positions than girls. Kyphosis and vertebral caries are most common among girls.

Dr. J. Körösi, the official statistician of Buda-Pesth, has recorded the age of parents of 29,813 cases of death of children. He finds the age of the mother is more determining on the health of the child than the age of the father. Mothers under twenty are very prone to have children who die young. The least deaths were when the mother was from 30 to 35. Fathers under 25 also have sickly children, but are best able to have good children from 30 to 40. The "age combination" brings out the fact that women of from 30 to 35, and still more those younger, should not marry men over 50. Women over 35 should not marry men under 30.

Every one who is shut up in a school-room during most of the year needs a change of scene and interest in vacation. To meet this demand, W. Winkler proposes to found an ideal "Leherheim," or teacher-house, at the foot of the mountain Riesengebirg. His paper describing the collection of opinions concerning such an ideal resort has much interest.

Dr. Julius Lang has just published a popular manual on school-hygiene in German. It is full of details concerning floor, windows, heating and ventilation, school diseases. He insists on instruction on hygiene, the rationals of gymnastics, vertical script. The pamphlet has only thirty-six pages and should be put into English.

Dr. Combe has printed an admirable medical report on the schools of Lausanne. He holds that medical supervision should be maintained everywhere, but that it should be advisory and the responsibility of action should be left with the board. He held a polyclinic in the City Hall part of the year, for which the city furnished the drugs. Out of 3650 school children, 1569 were more or less ill during the year. Disorders of refractions in the eye were very common.

The German Society of Teachers for the Promotion of Temperance has offered a prize of 300 marks for the best essay on "What can the school, and especially the teachers, do to promote temperance?"

The school teacher's ophthalmic guide is a handy little manual of a dozen pages, with a chart for ready tests, by Dr. George Ferdinande Aberdeen, 1892.

The English committee for investigating the bodily and mental state of school children have reached the following results: There are constitutional differences between boys and girls. Boys are most prone to irregular development, brain disturbance and mental weakness. While girls are prone to be pale, delicate and poor in blood. Exceptionally small skulls are smallest among girls, and in half the cases are accompanied by mental weakness. Insufficient food and great blocks of city buildings prevent perfect development, and incline children to nervous weakness and to failure in school work. Day pupils are healthier than boarders.

The first great hygienic exposition now open in St. Petersburg is to result in a permanent hygienic museum.

Glasses for color-blind pupils are now effective on the principle that colors of equal brightness, which are therefore not distinguished to the color-blind eye, can be distinguished by glasses which make them unequal in brightness. In the red-blind eye, purple glasses make green darker than red and therefore distinguishable.

Of the teachers now pensioned in Prussia, the men average sixty-four years of age and have served an average of forty-one years. The women average fifty years of age and have served twenty-nine years.

Dr. Cohen-Brach asked many children in each of the six classes of a public school in Gratz to begin in the middle of the desk and write with the left hand. In the lower class forty-three per cent. of boys and sixty-seven per cent. of girls wrote mirror script. Three per cent. decreased in going up the grades to from eight to thirteen per cent. Thus it does not seem, as Soltmann said it was, a "mirror of a diseased soul."

One of the best treatises on physical education in small compass is just published in German by F. A. Schmidt. He divides exercises into those of strength, skill, rapidity and endurance, and discusses each physiologically. He has no great praise for "attention exercises." In the second part he discusses the exercises most fit for different periods of life, divided by the ages 6, 9, 14, 20, 30, 40, 60. [Leibesübungen, etc. Leipzig, 1863, pp. 84.]

The cultus minister of education in Italy has just issued an official warning against over-work in school. Our schools, he says, teach too much and digest too little. Lower schools should arouse interest in culture rather than impart it. The brain has not grown equally with the progress.

Another comprehensive system of tests of hearing is just published by Dr. G. Nager, who, in the years 1892-'93, tested 1386 children in Lucerne. He had conjectured from the diversity of results hitherto obtained that local influences must be greater than had been supposed, and that the damp air of Lucerne predisposed

to catarrh and ear troubles. The Bezold method of whispered numbers is better than the test by means of the distance at which a watch can be heard, because the children must repeat what they hear. Each ear was tested alone and the eye diverted so it could not aid. Two-place numbers only were used, and twenty metres is taken as normal distance. If, with both ears, the greatest distance was much under one metre—thirty-three children—they should be sent to special schools. Analysis of ear-wax showed a great influence of dust and impurity of air. Training of attention overcomes quite a degree of deafness, but on the other hand, many children thought dull are only partially deaf.

Dr. K. Liebrecht has just measured the direct sky-light surface per pupil in Halle and found from one-tenth to nearly half the seats unsuitable. Many desks receive no direct sky-light, and that most often where it is most needed, in the lower floors where younger children are.

An association for health in education has just been formed in Berlin, composed of doctors, teachers and parents. Its purpose is to judge everything in school life and work from the standpoint of health, and to be a point of union for all the partial associations which make for health, such as drill, plays, swimming, vacation colonies, meals for poor children, vaccination, heating, lighting, vertical script, etc.

Berlin allows but seventy pupils in the lowest classes of the public school, and but sixty in the highest class. The average number in each class in each of the twenty-seven largest Prussian cities is below this, being largest in Münster, eighty-two, and smallest in Stettin, forty-nine.

F. R. Stutzer of Munich urges that in all classes after the first hour, there should be a recess of five minutes; between each later hour a recess of fifteen minutes, and that children should leave the room, which should be aired, and, if practicable, the building, and that their exercise should be free.

Professor Bystroffs found that eleven and six-tenths of 7478 school children of both sexes in St. Petersburg were prone to headache.

In Memphis, Tenn., it was found that, of 681 school children, 588 had full acuteness of vision, and of ninety abnormal cases, fifty were due to general causes and thirty to strain. Short-sightedness increased up the grades from almost nothing to fifteen per cent. in the highest classes. The children were from an old and badly-lighted, and from a new and well-lighted school-house. The result showed great advantages for the new house.

Dr. Allen examined the eyes of 4700 children in 170 schools in Columbus during school hours. Twenty-five per cent. of all had either one or both eyes defective, in either refraction or acuteness. Twenty per cent. were defective in both eyes. Short-sightedness increases from nothing to eleven and three-tenths per cent. at the age of seventeen.

The tests of Flavel and Tiffany in Kansas City were made on 2040 children and showed nearly the same results. Girls suffer more than boys from eye defects; English least, seventeen per cent.; German most, twenty-four and eight-tenths per cent.

An interesting circular letter by Dr. Mouton of Hague has been issued to the teachers of that city. It contains five rules for the care of the ears; three for the nose; eight for the lungs; eight for the eyes; eleven for sitting, and eleven for general care of the body.

A curious psychic epidemic is reported in a Stuttgart school. It was confined to girls of the lower classes from nine to twelve years of age. One day a child fainted, and soon nearly one-third of the class were affected, and it spread through the school. Some lay unconscious on the floor and could not be raised; twenty-five were screaming and trembling. There was rarely cramp, but eyes were usually closed and there was often entire unconsciousness. Each was treated to a pint of cold water dashed in the face, and told it would be repeated till such nonsense ceased. The treatment was instantaneously successful.

Von Hartmann thinks the general culture of the higher classes in Germany is declining, because of the great increase of beer-drinking in universities. Paulsen, too, fears "academic Philistinism" from the same cause. Freytag fears national decay, because so much time is spent in clubs and in beer houses. School diseases cannot compare with beer diseases.

Of 1985 London children, only 527 had good teeth. Among the latter were 4677 bad teeth, of which 1685 were permanent, and 2991 were the teeth of childhood. One school provides for stated examinations of the teeth, and fifty pounds per school is suggested as the average cost.

The revival of Greek gymnastics in Germany and of popular plays and games in England, and also in France and elsewhere, is interesting and full of interest. In Germany courses are now given for teachers and children in volks plays and games.

Since the establishment of criminal statistics in the German empire in 1882, the number of condemnations has not only increased largely, but the number of convictions of children between twelve and fifteen increased eighty-four per cent. between 1883 and 1889. Thus, of the 30,000 criminal youth of Germany, an increasing proportion is found among the youngest class.

Turnham found only eight children among 21,333 insane people. Children are often idiotic. Next most frequent as they grow older comes mania. Melancholy is rare. Symptoms of insanity are of course not full blown and it may be more frequent than is generally supposed.

The movement started in Germany by Lieutenant M. Von Egidy, and now represented by the quarterly journal called *Einiges Christenthum*, is not quite identical with the French "neo-Christian" movement. It is a result of that movement as much as the new German study and journal of hypnotism are of French origin. Is the conqueror again to sit at the feet of the conquered? Professor Lehmann-Hohenberg of Kiel is Von Egidy's chief coöperator. The journal is not for learned treatises, but for short, earnest words to the heart of the people. It is a religion without dogma or creed. A new manhood is beginning on earth. It must be as free of confessions as of parties, or economic and business interests. Von Egidy came more and more to realize that our public life was not

Christian, and that the church did not advance religion among the masses, who are drifting into antagonism to faith and toward anarchy. The people must see that true piety is not connected with orthodoxy. All true knowledge leads to true religion. True knowledge is not the superficial criticism found in severely scientific journals by those who lack heart-culture and, therefore, are not fit to speak to the people. "Unitary Christianity" will solve social questions. More earnestness must make religion, not something beside life, but life itself. Educational questions are among the first to be taken up. The history of evolution teaches that it was never so rapid as now, only now it is all on the plane of humanity. The ripe fruit of many who have worked for the elevation of the human race is about to be gathered for us. Means of communication have brought a greater solidarity than ever before, and coöperation must mean fraternity and love. Religion must again be the basis of education. The people must be religious.

CORRESPONDENCE.

To the Editor of the PEDAGOGICAL SEMINARY:

In a recent article by the president of one of our leading universities, the subject of medical education is approached, from the foundation, a side which I have strongly advocated. It seems strange that with the vast amount of literature that has appeared in the last few years in reference to university education, few have taken in hand the important subject of medical preparatory education. With the exception of references to it by Presidents Hall and Adams, little or nothing has seen the light, bearing upon this side of medical education. The efforts of medical colleges in the last two decades have been almost entirely directed to increasing the demands upon the student during his strictly medical course. The methods of teaching have been greatly improved, the course has been lengthened and graded, the requirements for graduation raised and the old seven chairs largely increased in numbers, making room for many new subjects, to be added to the curriculum —while others that were only touched upon under the old régime are now fully taught.

One of the pioneers in this crusade has been my teacher and friend, Professor Alfred Stillé, through whose efforts the chair of pathology was added to the seven chairs in medicine of the University of Pennsylvania, marking one of the first steps in the new movement.

Yet, with all that has been accomplished from this time to the present, the requirements for admission remain practically the same, and though we have a State Medical Examining Board in New York, the requirements are so meagre that it has not affected the better schools of this state, only compelled the poorer to require something as a prerequisite to entrance upon the study of medicine. This is as good a beginning as could be expected under a state law, but is far from what it should be.

The structure now reared in the minds of students in our best medical schools, is too heavy to be carried by most men without a liberal education, on which to build. It is at this end of medical education that reform should begin. There should be schools where more preliminary education shall be required than is now demanded for entrance upon an academic course in our colleges of arts and sciences. Still this is all that even our best schools now insist upon. In most instances the preliminary examination is a dead letter. As yet there is no one medical school that places a premium on college-bred men. These men are compelled to go over many studies which they have mastered in their college courses, and to occupy benches beside those only having a common school education at most, listening to details which they have been

over—subject to the same work and like examinations. Thus medical instructors have put a premium on illiteracy, hence we have in our ranks more uneducated men than are to be found in any of the learned professions. The crying need of the day is for a school that shall say to all who enter, you must have a degree from some reputable college in arts and sciences where the college course has been arranged in its junior and senior years, with special reference to their future profession.

I am far from advocating the adoption of such a course in all schools at the present time, as the country is not yet ready for such an advance. But there should not be enough of such colleges to encourage those desiring a more liberal education, to lay a good foundation before rearing the great building, which the best schools demand, that some strong and many weak men are endeavoring ineffectually to carry with little or no foundation to build upon. The schools that will take this stand will furnish the country the leaders of the profession. The fashion and necessity have been for men on this continent, who desire the most thorough education, to seek it in European schools; but this country should in the near future furnish all that can be found in any country, and it can if it only will.

This is the more essential, as the types of disease are likely to vary with country and clime, and as a rule they do; those seen on this side of the Atlantic differ materially from those seen on the other. Therefore, the study of disease for the American physician, under the same conditions, would be more profitably pursued at home.

The time should not be far distant when the physician of the old continent will seek our schools for a certain amount of medical culture.

GEORGE G. HOPKINS, A. M., M. D.
350 Washington Ave., Brooklyn.

A correspondent asks us to print the following:

Language is a means of thought-getting and a means of thought-expression. In thought-getting by means of language we use either the ear in hearing oral language, or the eye in seeing written language; the former involves the power of understanding oral language, the latter the ability to read. Language used as a means of thought-expression includes oral language, or talking, and written language, or writing, including spelling, capitalization, punctuation, etc. The means of expression in the former case are the vocal organs; those in the latter are the muscles of the hand.

The different links of association involved in the above four processes are the following:

(1) The association of the thought with the oral word. (2) The association of the sounds composing the word with one another. (3) The association of the group of sounds composing each word with the groups of sounds composing other words, or the association of oral words in the mind in groups. (4) The association of the thought with the group of muscular movements required to utter the word. (5) The association of the oral word with the group of muscular movements required to utter it. (6) The association of single muscle movements with one another. (7) The association of groups of muscular movements with one another in succession. (By the term "group" of muscular movement here, is meant the combination of the muscular movements requised to utter one oral word.) (8) The association of the thought with

the written or printed word. (9) The association of the thought with the muscular movements of the hand in expressing it. (10) The association of the written or printed word with the muscular movements of the hand required to make it. (11) The association of muscular movements of the hand with one another in succession. (12) The association of groups of muscular movements of the hand with one another. (13) The association of the oral word as a whole with the written word as a whole. (14) The association of the sounds composing the oral word with the letters composing the printed word.

Problems.—(1) Which of these associations does the child make in learning to talk? (2) Which does he make in learning to write? (3) Which does he make in learning to read silently? (4) Which does he make in learning to read orally? (5) Which does he make in learning to understand oral language when he hears it spoken? (6) Which of the above associations are involved in phonics? (7) Give at least five illustrations of each of the above links of association. (8) How many other links of association involved in the processes of acquiring language, written or oral, can you discover? (9) What associations are made in learning French or German by the natural method? (10) What associations are made in learning French by means of translation? (11) What difference is there in this respect between our current methods of learning a modern language and those of learning an ancient language like Latin or Greek? (12) Why does a person learn to speak modern languages, and why is he unable to speak Latin or Greek, when he has studied the latter very much more "thoroughly" than the former? (13) Which of these associations should the child make unconsciously, and which may or must be made consciously? (14) Is the order in which these associations are made important in cases where two or more associations must be made? Give as many illustrations of this as you can think of. (15) Give two illustrations of each of the following links of association, not included in the above: (a) The association of an idea with an idea. (b) Of an idea with a feeling. (c) Of a feeling with a feeling. (d) Of a muscular movement with a feeling. (e) Of sense impressions with feelings.

To the Editor of the PEDAGOGICAL SEMINARY:

In Vol. I, No. 2, p. 303, of the PEDAGOGICAL SEMINARY, there is a statistical note on the universities in Europe. Allow me to say that *Switzerland* has not three universities, as the note states, but *six*, some of them indeed only recently founded. They are: Basel, Geneva, Berne, Zürich, Lausanne and Freiburg, with together from 1,500 to 2,000 students. *Basel* was founded by Pope Pius II, in 1459, and reorganized in 1817 with four faculties. *Berne*, founded in 1834, with four faculties. *Geneva*. In 1420 François Versonnex endowed and restored the "great school," which continued and flourished till the Reformation. An academy and college were established by Calvin and Beza in 1558. Since 1875 the academy has ranked as a university, having five faculties (scientific, literary, legal, theological, medical). *Zürich*, founded in 1832-1833 as a successor to the ancient chapter school at the Gross Münster, said to date back to Charlemagne's time—hence its name, Carolinum—reorganized at the Reformation, and suppressed in 1832. *Lausanne*. The academy (with three faculties, no medical school) was founded in 1589, and two or three years ago made a university with all the four faculties. *Freiburg*, the youngest of the Swiss universities, was founded three years ago, if I am right (it may also be four years ago).

Yours very respectfully,

University of Chicago. L. C. MONIN, Docent in Philosophy.

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[1] On p. 236 ("Mirror Writing and Left-Handedness") this author's name is erroneously given as M. Strack.